

NEW ZEALAND MAORI BARKCLOTH AND BARKCLOTH BEATERS

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Abstract. This study synthesizes all the available information on barkcloth manufacture and use among the Maori of New Zealand. Documentary and traditional Maori records of paper mulberry trees and barkcloth show that aute barkcloth was made or known in North Auckland, Auckland, Waikato, Hauraki, central Bay of Plenty and the East Coast. Other native trees, especially *Hoheria* species, are discussed as possible sources of barkcloth. *Broussonetia papyrifera*, paper mulberry, became extinct in New Zealand by the 1840s. Specimens of actual barkcloth found in New Zealand are restricted to Otago, completely removed from the documented areas of barkcloth manufacture. Fourteen Maori barkcloth beaters have been located in museum collections, all of which are fully described here for the first time. These beaters come from North Auckland, Auckland, Waikato, Bay of Plenty and Taranaki. Displaying a diversity of form, these New Zealand barkcloth beaters have a strong affinity with nineteenth century barkcloth beaters of Eastern Polynesia. However, detailed comparisons with archaic Polynesian barkcloth beaters from the Vaito'otia/Fa'ahia site on Huahine, which are published here for the first time, reveal significant differences. Actual and supposed traditional Maori use of barkcloth is reviewed, revealing that its use was probably more restricted than generally believed.

Among their many traditional skills, the early Polynesian settlers who reached the islands of New Zealand brought with them the knowledge and techniques for making barkcloth from the inner bark of various suitable trees. In the tropical Pacific, barkcloth was made most commonly from the inner bark of the paper mulberry (*Broussonetia papyrifera*), various figs (*Ficus* spp.) and the breadfruit (*Artocarpus altilis*), all members of the family Moraceae, using techniques that have been widely documented since first European contact (Kooijman 1972; Ragone 1991:214-216).

In New Zealand, the Maori descendants of these Polynesians made barkcloth, which they called aute, from the same paper mulberry tree which they also called aute, and perhaps from other local trees endemic to New Zealand, especially the lacebark (*Hoheria*). The tropical breadfruit tree and the fig never became established in New Zealand but botanists agree that the paper mulberry was introduced into New Zealand from the tropical Pacific by these early Polynesian settlers (Green 1975:111; Merrill 1954:343; Whistler 1991:55). New Zealand Maori also retains the word "hiako" now meaning "skin, hide, bark, rind" (Williams 1971:48), presumably cognate with "siapo" in Samoan and "hiapo" in Niuean, both referring to actual barkcloth.

Colenso (1880:18) gave a succinct summary of current knowledge about paper mulberry and barkcloth in New Zealand that has not been improved on very much since his time of writing:

"I will first mention the Aute = Paper-mulberry (*Broussonetia papyrifera*) although, as far as I know, not a single vestige of this plant is now left in New Zealand! its name remains and that is all. Few Maoris now living have ever seen it; and yet, in ancient days, it was commonly and largely cultivated throughout the country. At the time of Cook's visit it was very common, and seen by those early voyagers everywhere, both growing in their plantations and worn in fillets by the chiefs in their hair; the thin white bleached paper-like bark contrasting excellently well with their ebon

locks! Very many of the heads of Maoris, in the plates of both Cook's Voyages and Parkinson's Journal, are drawn thus ornamented with the aute. Yet though commonly cultivated, it was of small size, and never was used by the Maoris for clothing purposes, as it was by many of the other Polynesians. The chiefs also made ornamental paper kites of it, which was one of their great diversions in time of peace, especially among the older men."

Presumably, the techniques of barkcloth manufacture followed in New Zealand were very similar to those employed in tropical Polynesia. If wooden beating anvils were used in New Zealand, they have not survived or at least have not been recognised in the archaeological record. Therefore, apart from the pieces of reputed Maori barkcloth that have survived, the only material evidence of barkcloth manufacture in New Zealand is the few barkcloth beaters that have been preserved in museum collections.

Two of these barkcloth beaters, both from Whangarei and at that time the only known examples, were reported in the literature many years ago by Buck (1924:34-38) with a very detailed analysis of their implications for barkcloth manufacture in New Zealand. Another beater, from Taranaki, was reported very briefly by Day (1984:16) without any analysis. Further beaters were known in a few museum collections but these have never been published previously except for a brief report by Wallace (1989:226) detailing the botanical identification of the wood used in the Taranaki beater and in five other barkcloth beaters in the Auckland Museum. Subsequent inspection by the present writer of Maori wooden beater collections in the Auckland Museum and other museums around the country has led to the identification of more Maori barkcloth beaters.

Although there are several other marginal examples, the total number of known definite Maori barkcloth beaters can now be increased to 14, indicating that they are a much more significant item of Maori material culture than previously realised, even by recent writers such as Davidson (1984:92, 104). Writing sixty years previously and before he knew of the Whangarei barkcloth beaters, Skinner (1920:52) had suggested that, because of the scarcity of *Broussonetia papyrifera* in New Zealand, the tapa beater which had been of such importance in the social life of Polynesia would have fallen out of practical use in New Zealand. He even argued that perhaps the Maori baton called a patuki with its surface decoration and apparently ceremonial function might be the New Zealand descendant of the Polynesian tapa beater. But in fact, patuki and barkcloth beaters are totally different in conception and appearance, and as the evidence now assembled here demonstrates, barkcloth beaters did not fall out of practical use in New Zealand.

Indications from the archaeological context of the New Zealand barkcloth beaters suggest that their form has remained basically similar through a long history of Maori barkcloth manufacture. Judging by the similarity of these Maori beaters to the beaters used by tropical Polynesians into the 19th and 20th centuries, the techniques of barkcloth manufacture in New Zealand probably also remained very stable throughout this period and closely resembled the techniques reported in Polynesia in historic times. The persistence of these wooden barkcloth beater techniques in New Zealand can also be regarded as oblique evidence for the antiquity of wooden barkcloth beaters in tropical Polynesia, given that these techniques must have been introduced to New Zealand from tropical Polynesia many hundreds of years ago. This evidence supplements that provided by the only occurrence of wooden barkcloth beaters in the tropical Polynesian archaeological record, those from the Vaito'otia/Fa'ahia site on Huahine in French Polynesia. A detailed comparison will be made below between the New Zealand and Huahine barkcloth beaters.

THE PAPER MULBERRY TREE IN NEW ZEALAND

Merrill (1954:343) and later botanical writers have accepted that *Broussonetia papyrifera* was spread through the Pacific from South-east Asia by the hand of man. Being highly prized for the manufacture of barkcloth, this tree has been one of the most carefully cultivated species in Polynesia. It does not set seed in Polynesia but is propagated vegetatively (Whistler 1991:55). A New Zealand botanist, Sykes (1969) reported that paper mulberry is not a tropical plant but is really a warm temperate species that dies out in hotter climates unless cultivated, a sign that it is not completely adapted to the tropics. Sykes further noted (Letter, W.R. Sykes to A.E. Wright, 3 July 1985, Auckland Museum files) that the species is primarily deciduous, as in the regions of Taiwan and Japan where it is indigenous and therefore it is not surprising that it is deciduous in temperate New Zealand. Sykes believed that it only retains its leaves in places such as Tonga and Fiji because of the effect of a tropical climate on what is really a warm temperate plant.

Most recently, Matthews (in press) has reviewed the botanical history of *Broussonetia papyrifera* and the evidence of its spread beyond its natural range in China, Korea, Japan and mainland South-east Asia. He does not provide a map of the plant's geographical range in New Zealand but he does suggest possible reasons for its extinction here.

In New Zealand Maori language, the paper mulberry is known as aute, cognate with aute in the Cook Islands and the Society Islands, with ute in the Marquesas and wauke in Hawaii. According to New Zealand Maori traditions, aute was brought to New Zealand on the Oturereao, the Tainui, and the Aotea ancestral migration canoes (Andersen 1907:322; Buck 1950:63; Hammond 1924:120; Orbell 1985:115; White 1888:8). Marama arrived with her aute tree on the Tainui but because of her indiscretion in having an affair with a slave, her aute was transformed into the whau which is useless for making cloth (Andersen 1907:11; Orbell 1985:116). The ancestress Whakaotirangi is credited with planting the first aute in the new land of Aotearoa (White 1888:8).

Within New Zealand, paper mulberry is usually considered to have been restricted to the North Auckland peninsula down to the Waikato district, Coromandel, Bay of Plenty and perhaps around the East Cape to northern Hawkes Bay. Palmer (1989:18) commented that the tree is hardy throughout lowland New Zealand but he is presumably referring to those planted since the recent re-introduction of the species from Japan (Sykes 1969). Nevertheless, this does suggest that climate is not a primary limiting factor for the geographical range of paper mulberry in New Zealand. An examination of the geographical evidence for cultivation of paper mulberry in pre-European and early post-contact times may allow this distribution to be documented more accurately. Records of paper mulberry trees, barkcloth use and other associations with a geographical reference are plotted on the map (Fig.1) according to the alphabetical key for each entry.

DOCUMENTARY RECORDS OF PAPER MULBERRY TREES AND BARKCLOTH

A. Captain James Cook noted in his journal for 22 October 1769 that the people at Anaura Bay were at first very keen to trade for the Tahitian tapa cloth that Cook's men had brought with them but soon lost interest in the island tapa (Beaglehole 1955:182). Beaglehole believed that this loss of interest resulted from Maori realisation that the island cloth was the same as their own Maori barkcloth, although available in unprecedented quantity from Cook's men.



Fig. 1. Map of the North Island of New Zealand showing localities referred to in the text, indicated by the letter or Roman numeral heading each entry. A-J, Documentary records of paper mulberry trees and barkcloth; K-T, Traditional records of paper mulberry trees and barkcloth; I-XIV, New Zealand barkcloth beaters.

- B.** Monkhouse with Cook at Anaura was uncertain whether the “cloth plant” was cultivated there but he must have seen something to cause him to make this observation (Beaglehole 1955:584). Monkhouse’s comment is ambiguous but Salmond (1991:227) takes it to infer that aute was growing wild at Anaura and Uawa.
- C.** Cook at the Bay of Islands in December 1769 recorded that he saw about half a dozen cloth plants “being the same as the inhabitants of the islands lying within the tropics make their finest cloth of” (Beaglehole 1955:218). He went on to comment that the plant must be very scarce as the barkcloth made from them was only used as ear ornaments in small pieces.
- D.** Joseph Banks at the Bay of Islands with Cook explained explicitly how the Maori valuation of barkcloth changed:
 “Our Island cloth which used to be so much esteemed has now entirely lost its value: they have for some days told us that they have of it ashore and shewd us small pieces in their ears which they said was of their own manufacture, this at once accounts for their having been once so fond of it and now setting so little value upon it.”
 (Beaglehole 1962 I:442)
- Banks saw the same small plantation of paper mulberry trees described by Cook, confirming that the six plants were definitely paper mulberry, which the Maori used to make ear ornaments (Beaglehole 1962 I:444).
- E.** Sydney Parkinson at the Bay of Islands with Cook commented that: “We saw many plantations of the Koomarra, and some of the Eaowte, or cloth trees” (Parkinson 1784:110).
- F.** Colenso (1880:18) reported that he saw paper mulberry growing in the Bay of Islands only once, in an old plantation at the head of the Kawakawa River in 1835. Even this was only one small tree about six feet high and so unhealthy that it died soon after.
- G.** In 1844, Colenso (1880:18) was told of some aute trees still growing at Hokianga.
- H.** Gilbert Mair noted sometime in the 1880s that “Aute or Tappa was grown by Te Pahipoto at Puketapu Pa and also at Okataina” (G. Mair, Notebook 29, p. 36. Alexander Turnbull Library). “Puketapu Pa” probably refers to the pa at Te Teko, famous as the home of Te Ramaapakura, a chief of Ngati Awa. Te Teko is the headquarters of the Ngati Pahipoto hapu of Ngati Awa. “Okataina” is a reference to Lake Okataina in the Rotorua district, the territory of the Ngati Tarawhai tribe of Te Arawa.
- I.** Best (1925:73) records that the paper mulberry was cultivated in the Waiapu district of East Cape.
- J.** At a Maori Land Court hearing on March 3, 1900, for a block of land at Lake Rotoiti, Tieri Te Tikao mentioned in his evidence:
 “I now recollect that at Kauaeapuapu is growing a “ka” [bamboo or cane]. Another thing they planted there is an “aute” but I am not sure whether it is still growing - I saw it there when I was young. I then lived at that pa. It was in my time that we moved to Pukearuhe. I was nearly adult. I went to join the Hauhaus. I am not quite sure whether the “aute” was growing at Kauaeapuapu or at Ngamokai-a-Tinirau. There was only a fence between the kaingas. It is a very long time ago - I have not been there in recent years.”
 (Maketu Land Court Minute Book 21:178)

The localities described by Tieri Te Tikao are near Lake Rotoiti in the Rotorua district and judging from his comments, the time when the aute was growing must have been about 1840 or 1850.

TRADITIONAL RECORDS OF PAPER MULBERRY TREES AND BARKCLOTH

Placenames and proverbs relating to paper mulberry trees and barkcloth with a geographical reference can also be regarded as possible indicators of the geographic range of paper mulberry, of course with varying degrees of reliability.

K. According to Buck (1950:161) the place name of Te Aute in Hawkes Bay is said to commemorate an unsuccessful attempt to grow the plant in that locality. Earlier however, Buck (1924:34) had commented that this name had been transferred from its original locality at some unspecified place. Other sources (Alexander 1951: 35; Friends of Te Aute College 1973) consider the name to be derived from the tradition that aute trees once grew on the hills behind the college and gave their name to the original Maori village at that locality. Both these sources quote the earliest known reference to Te Aute, from Donald McLean's journal entry for 16 December 1850: "In the evening we crossed to Te Aute, a beautiful clean settlement with a fine clump of forest and beautiful grazing land around it". The endpaper map in Woods (1981) biography of the Rev. Samuel Williams, founder of Te Aute College, pinpoints the "site of original Aute tree" but gives no explanation. One can only conclude that the traditions surrounding the reason for the name of this locality have become confused.

L. Aute occurs as a place name on the Manukau Harbour, opposite Puponga Point or Cornwallis (Andersen 1942:388).

M. Te Aute is the name of a bay in the Opito block, Coromandel district (Andersen 1942:388).

N. A Maori proverb stating "Haere mai ki Hauraki, te aute te awhea" which Colenso (1879:145) translated as "Come hither to Hauraki, where the prepared paper mulberry bark is not blown away by the winds while drying and bleaching" can be regarded as evidence for paper mulberry growing and barkcloth manufacture in the Hauraki district. Buck (1924:32) has given other versions of this proverb which convey the same meaning.

O. Percy Smith has recorded a tribal saying of Ngati Whatua of Otakanini pa in southern Kaipara, as "Te aute te whawhea" which he translates as "girded with aute" (Brigham 1911:18; Smith 1895:43), suggesting that the plant and its cloth were well known in that district.

The phrase "te aute te whawhea" or "te aute te awhea" occurs in several versions of the proverbs noted here in sections N and O. Buck (1924:32) has questioned Smith's interpretation of girding on the aute cloth, instead supporting Colenso's understanding of a place where the aute tree or the treated aute barkcloth is not disturbed, either by winds or the passing of a war party. Certainly, in the most recent recording of a series of Ngati Whatua proverbs about the chiefs of Otakanini which contain this phrase (McRae 1987:41, 51, 62) it is the idea of the aute not being disturbed which is accepted. However, comment is also made that "the saying about the aute refers to the fact that the chiefs of the Otakanini pa in the Kaipara were of rank sufficient to constantly wear garments made from that very rare bark of the paper mulberry

tree” (McRae 1987:51). Obviously, regardless of detail, aute trees and cloth made from them were a prominent component of the cultural assemblage in the southern Kaipara, a fact supported by the finding of barkcloth beaters in the area.

P. A tribal saying attributed to the chief Pokere of Hauraki likens his successor Hauauru of Hauraki to an aute tree growing in his home district (Buck 1924:33; Graham 1903). As Whareterara Hapi explained the proverb to Graham, the aute tree was figurative of an heir, being a thing of value. Such trees were planted about the pa and in the wars of olden times the aute plantations were invariably destroyed by the attacking forces.

Q. Aute occurs in the name of Te Potae Aute (the aute hat), a prominent chief of Ngati Porou at Tokomaru Bay (Buck 1924:34). Grace (1959:327) tells of a chief named Te Potae aute from Poverty Bay who was instrumental in raising an intertribal force to attack Te Wera Hauraki at Mahia.

R. Buck (1924:34) records Ngati Aute as the name of a sub-tribe in Hauraki. This is presumably the same as the hapu of Ngati Maru known in the 1920s as Ngati Manuaute, and more recently as Ngati Te Aute. According to Graham, the name Ngati Manuaute refers to the kite flown at the place now called Manurewa by Tamapahore who later moved to live with his mother’s people at Piako where his descendants became known as Ngati Manuaute (Maysmor 1990:61). A Ngati Maru ancestor named Te Aute appears on whakapapa five generations below Marutuahu. An authoritative modern Ngati Maru source (Watene 1978:4, 35, 88, 90) attributes the hapu name Ngati Te Aute to the marriage of Poutangi, one of the main descendants of Tamatepo, first son of Marutuahu, to Te Aute a chieftainess of Te Arawa from Rotorua. In other Ngati Maru whakapapa however, Te Aute is shown as a direct descendant of Taurakapakapa, a son of Marutuahu.

S. In a Ngati Porou lament composed in early European times by a man of the Waiapu district, reference is made to “he kiri aute” which A.T. Ngata translated as “a cloth of the aute” as opposed to a European blanket (Ngata 1928:113).

T. In a traditional account written in North Auckland before 1856 and recorded by John White (Simmons 1976:361), the ancestor Kahungunu decorated his topknot and his ear with aute cloth. This cloth was described as having been stripped from the tree and then beaten with a beater called a paoui, but the strips were only as wide as a child’s finger.

THE EXTINCTION OF PAPER MULBERRY IN NEW ZEALAND

In view of the temperate climate origin of *Broussonetia papyrifera*, the reasons for the later demise of paper mulberry in New Zealand are clearly more complex than the usual simple explanation of climatic unsuitability.

Matthews (in press) has suggested several possible factors which might have contributed to the plant’s decline in New Zealand. These are (i) a decline in cultivation, (ii) destruction by newly introduced herbivores, especially cattle, (iii) an inability to breed and disperse by seed, due to the introduction of only one sex, or geographically segregated introductions of both sexes [*Broussonetia papyrifera* being dioecious], (iv) loss of flowering ability, because of mutations accumulated over a long period of vegetative propagation and cultivation, (v) previous adaptation to tropical conditions, leading to weak vegetative growth in the temperate

climate of New Zealand, and (vi) an accumulation of pathogens or harmful mutations, leading to weak vegetative growth.

Colenso (1880:18) cited an 1844 report from E. M. Patuone stating that the paper mulberry plants at Hokianga had been almost totally destroyed by the grazing of cattle. Matthews (in press) reported that paper mulberry was actually used as cattle fodder in Taiwan. The effect of introduced pigs in New Zealand also needs to be considered. Sometime about the turn of the century, Tutakangahau of Tuhoe told Best that the aute plant had become lost to his tribe in the time of his grandparents (Best 1925:73). This Tuhoe region would have been far distant from the possible ravages of cattle but well within the range of recently-introduced pigs.

From an anthropological point of view, more emphasis may need to be accorded to the suggestion of a decline in cultivation resulting from a deliberate Maori choice of whether to propagate or not, a decision in which changing fashions of dress and ornament were probably the prime movers. From Colenso's evidence, the paper mulberry tree must have become extinct in New Zealand sometime soon after the 1840s. Healthy *Broussonetia papyrifera* growing around Auckland and other places today are the result of recent imports of new stock from Japan and China.

OTHER TREES USED FOR BARKCLOTH IN NEW ZEALAND

Within New Zealand, the barks of other native trees were used for making cordage and perhaps for making barkcloth. The lowland ribbonwood (*Plagianthus regius*) known to the Maori as manatu, houï, whauwhi and puruhi has an inner ribbonlike bark that was used by the Maori for making rope and twine for fishing nets and perhaps for other purposes (Laing and Blackwell 1964:270). The mountain ribbonwood (*Hoheria glabrata* or *Hoheria lyallii*) known to the Maori as houhi, houhere, hoihere, houii and whauwhi has an inner bark with the same lace-like appearance as that of the other hoherias (Laing and Blackwell 1964:268). Beattie (1994:47) has described a South Island type of cloak called a kakahu-houï made of ribbonwood bark (kiri houï) but this was only attested traditionally and no informant had ever seen one. As reported by Beattie, this ribbonwood bark could be scraped, dried and beaten into a material suitable for making clothing, baskets, poi balls, hair ribbons, belts, piupiu and hats.

The sand daphne (*Pimelea arenaria*), known to the Maori as autetaranga or autetauranga, belongs in the same family (Thymelaceae) as the lokta of Nepal and the mitsumata and gampi of Japan, all used in papermaking. Williams (1971:23) notes that an inferior kind of cloth was made from autetaranga bark. According to Riley (1994:336) the inner bark of autetaranga was made into white cloth-like strips by a simple process involving chewing. These strips were then used as ribbons to fasten up the hair, threaded into the belts of chiefs and also worn as ear ornaments. Recent retting and beating trials by Graveson (1996), an experienced papermaker, on autetaranga inner bark indicate that it is possible with some difficulty to produce a tapa-like cloth from this tree.

By far the most common native trees said to have been used for barkcloth were the lacebark (*Hoheria populnea*) known to the Maori as houhere, hohere, houhi, houii, houhi ongaonga, whauwhi, wheuhi, and ongaonga, and the narrow-leafed lacebark (*Hoheria angustifolia*) known to the Maori as houhi, puruhi, houhi-puruhi and hungere (Beever 1987).

It is commonly believed that the inner bark of the lacebark tree was used for cloth-making in both an unbeaten and a beaten state. However, there is some informal experimental evidence that indicates difficulties in producing spread and felted lacebark cloth, although its manufacture was replicated experimentally (D. Bonica and M. Pendergrast, pers. comm. 1994; Graveson 1996). All of the descriptions of definite lacebark use in artefacts refer to

unbeaten bark. Best (1942:129) mentions “ropes made by twisting or plaiting the tough pliant bark of the houhi (*Hoheria populnea*)” and goes on to tell of old Maori accounts about how “in times long past, their ancestors endeavoured to make felted barkcloth from this material by the beating process which produced the tapa of Polynesia”, thereby implying that these Maori informants were aware of the unsuitability of lacebark for this process. Phillipps (1966:146-147) has described some of the hats, kits and headbands made in various parts of the country from unbeaten lacebark during the later 19th century. Riley (1994:148) notes several usages of the inner bark of lacebark, for medicines and cordage, none of which involve beating of the material.

Virtually nothing has been recorded about the process of making barkcloth by beating the inner bark of the lacebark, despite the frequent assumption that many of the barkcloth pieces found in the South Island are said to be made from *Hoheria* bark. Skinner apparently believed that he could distinguish *Hoheria* barkcloth on the basis of texture, describing a piece from a cave on the Upper Taieri River as of “extremely poor texture” like “coarse muslin” with “many large holes and the felting is everywhere poor (Buck 1924:39). Rowley (1966) tried to distinguish barkcloth made of *Hoheria* from barkcloth made of paper mulberry on the basis of differing cell width. She found that the fibres from paper mulberry appeared to be wider than those of *Hoheria* but admitted that further statistical studies were necessary for these results to be conclusive.

At the request of the present writer, an attempt was made by Dr Rhys Gardner, Auckland Museum Research Associate in Botany, to distinguish barkcloth made from the inner bark of *Plagianthus*, *Hoheria* and *Broussonetia* in a controlled experiment. Gardner found that samples of raw, unbeaten inner bark from these three trees could be readily distinguished microscopically on the basis of anatomical features. However, on examining named beaten samples of each type of bark supplied by Bonica and Pendergrast, Gardner found that the beating had totally destroyed these distinctive structural features, making it impossible to distinguish the sources of these barkcloths. Gardner believes that only chemical analysis of the material will provide a technique to definitely distinguish these fibre sources (Gardner, pers. comm. 9 February 1995).

No beaters specifically documented as lacebark beaters have been preserved in any museum collections. The only known reference to a lacebark beater is supplied by Hamilton (1896:273):

“This lacebark (hoihere) is used in thin bands as a head-dress; and the Rev. T.G. Hammond informs me that he has seen at Hokianga a carved bone patu used to give a fancy pattern to these bands”.

Buck (1924:39) commented that this usage of a beater designed to produce a patterned texture suggested an echo of the old Polynesian technique of barkcloth beating but he pointed out that the use of a bone barkcloth beater would be unique in all of Polynesia. Furthermore, Hammond’s account does not necessarily mean that the lacebark was actually spread or felted in this pattern-beating process.

In the absence of any evidence to the contrary, it would seem that the wooden barkcloth beaters to be described in this study are designed for use with paper mulberry bark. This assumption is supported by the differential geographic distribution which emerges of all the barkcloth beaters being localised to the north of the North Island and all the putative *Hoheria* barkcloth finds being localised to the south of the South Island. Another as yet unconsidered possibility is that some New Zealand barkcloth was made using a combination of raw inner barks from both the lacebark and the paper mulberry. A comparable combination has been reported from Tahiti and the Marquesas where some barkcloth was made from a mixture of raw inner bark of paper mulberry and *Ficus* or *Artocarpus* (Kooijman 1972:10, 182).

EXTANT SPECIMENS OF NEW ZEALAND BARKCLOTH

If the men travelling with Cook in New Zealand ever collected any local barkcloth, none of it has survived into the Cook voyage collections described by Kaeppler (1978). Nor do any of the New Zealand artefacts in these Cook collections incorporate any local barkcloth in their construction. However, in his recent book *Oceanic Art*, Thomas (1995:133) has illustrated a page reputedly from a copy of Alexander Shaw's *Catalogue of the different specimens of cloth collected in the three voyages of Captain Cook to the southern hemisphere, 1787* which shows a coloured and patterned piece of actual barkcloth labelled as "Bark cloth curiously formed in angular figures shewing the taste of the natives of New Zealand". This illustration is credited to the Mitchell Library at the State Library of New South Wales in Sydney but personal inspection of the three Alexander Shaw catalogues in the Mitchell Library has confirmed that this page does not exist in any of them. Nor does it exist in the Shaw tapa catalogue held in the Auckland Museum library. Thomas himself is unable to locate the source of this illustration. If this Shaw sample does exist and is genuinely from New Zealand, then it would be the only surviving piece of coloured and patterned Maori barkcloth. However, in view of the notorious confusion of Pacific localities on early labels and all the other documented evidence of Cook period New Zealand barkcloth as being white and limited to very small pieces, the chances of this piece being genuine New Zealand barkcloth are very slight indeed.

Brigham of the B.P. Bishop Museum in Honolulu claimed (1911:71, 244) that he had a specimen of New Zealand Maori-made barkcloth which he described as "white, thin and fairly well beaten, quite suited to the use our authorities tell us it served". Using Hawaiian-derived terms, Brigham further recorded it as "A white, mole, waoke kapa from New Zealand. C.F. Williams, 1850. Given by P.A.A. (E.3149). Very Rare".

In response to my enquiry, Dr Roger Rose, Curator of the Department of Anthropology at the Bishop Museum, has written:

"The barkcloth (Brigham, p. 244): This is a small sample (24 x 15.5 cm) exchanged to Bishop Museum in 1896 from the Peabody Academy of Science (P.A.S.) by Prof. Edward Morse, their Director of the time. The E.3149 number is the Peabody's number (ours is 1896. 08. 33), and C.F. Williams was the original donor, apparently in 1850. The Peabody had it catalogued as "said to be" from New Zealand, which Brigham followed. (It was not separately catalogued in the Bishop Museum collection until 1979, and as Hawaiian.) It is probably paper mulberry, very thin, creamy white, plain, and no apparent watermark. Kenneth Emory noted on the sheet to which it is attached in 1959 "probably Hawaiian", and I added later, "Indistinguishable from Hawaiian RGR 5/79." Peter Fetchko of the Peabody Museum wrote 20 June 1979 in answer to my letter that there was no further information in their files. We have no other barkcloth catalogued as coming from New Zealand".

(R. Rose, pers. comm. 11 May 1993)

Therefore, thanks to Rose's information, the status of this reputed specimen of Maori barkcloth has now been clarified and consequently it can be disregarded in this study.

Several finds of barkcloth have been recorded in New Zealand but strangely all the localised specimens have come from a very restricted area of Otago centred on the upper Taieri River. This restricted distribution may simply be a reflection of the suitability of the dry inland Otago climate for preserving textiles, but perhaps other factors are at work, such as a very localised manufactory. These finds have been complicated by inadequate and confused reporting in the literature, inadequate museum registration, doubts about the distinction between barkcloth made from paper mulberry as opposed to barkcloth made from lacebark, and the possibility that some of these finds are actually Pacific island barkcloth imported into

New Zealand at some early date. In the following entries, an attempt has been made to correlate the published records of New Zealand barkcloth finds with the actual specimens now held in museum collections:

U. Augustus Hamilton (1896:176) reported on the find in August 1894 by a Mr Mathewson (spelt wrongly by Hamilton, actually Mr R. A. Mathewson, later a member of the Dunedin Stock Exchange) of several fibre and textile items in a rock shelter about four and a half miles from Hyde on the upper Taieri River. Included among these were “a piece of very soft white tappa-cloth, 6 ft long and 18 in. wide at one end, tapering to a point; also an irregular strand of lace-bark, about 5 ft. long”.

All of the fibre and textile items from this find, including the “soft white tappa-cloth” but apparently not the “irregular strand of lacebark”, were eventually presented by Mr Mathewson to the Dominion Museum in Wellington where they were registered under numbers G1427 to G1433. By some unknown transaction all of these items are now in the Auckland Museum (AIM 51086, 51087, 51088, 54563, 54564) where they were incorrectly associated with the Sir George Grey collection. The soft white tapa cloth is registered as AIM 54565.

Hamilton himself considered that these articles had probably been made by Samoans, presumably in Samoa. He surmised that they were probably brought to New Zealand by a Maori who had served on an early whaling ship. Certainly, all the woven articles in this find would seem to be from tropical Polynesia even if not necessarily from Samoa. The mats could just as easily be from Wallis/Futuna or other Polynesian islands.

The present location of the piece of presumed lacebark cloth from this find is now uncertain. As one might expect from the presence of the other items from the same find, it could now be in Auckland Museum. Indeed, Auckland Museum does hold two pieces of white barkcloth (AIM 51085) which were thought to be associated with the Mathewson collection, but there is no evidence for this connection. The fact that the lacebark piece was not apparently presented or registered into the Dominion Museum collection in 1920 seems to indicate that it did not pass on to Auckland Museum with the other items. Other evidence assembled below indicates that this piece of lacebark remained in Otago Museum.

Skinner (in Buck 1924:39) described the piece of lacebark found by Mathewson, then apparently in the Otago University Museum, as being about 55 inches long and 27 inches wide, of a creamy brown colour and the texture of coarse muslin, with many large holes and poor felting. Both Skinner and Buck considered that it was made from lacebark (*Hoheria populnea*) and it is interesting that Skinner obviously believed it had been felted by beating.

Recent investigations by staff and the present author at Otago Museum suggest that this is probably the piece now registered as D34.617. Certainly the dimensions are a close match with D34.617, measuring approximately 136 cm long by between 55 cm and 63 cm wide. This is recorded as presented by George Fenwick and was registered as “old stock” in 1934. On David Teviotdale’s information, it is said to have been found in a cave in the Upper Taieri by a Mr Matheson (Moira White, Otago Museum, pers. comm. 27 August 1993).

From my own examination, D34.617 is brown in colour and has a very coarse uneven open texture consisting of diagonal crossing fibres, with many holes. It appears to be loosely felted but is totally different from *Broussonetia* tapa cloth. Insofar as the appearance of lacebark barkcloth is understood, this could well be made from lacebark. Skinner’s original museum display label for D34.617 said that it was made from a ribbonwood tree. In a 1986 Otago Museum special exhibition of Polynesian weaving and plaiting entitled “Patterns of Change”, this piece of cloth was said to be “made from southern ribbonwood bark, probably mid 1800s”.

Skinner (1952:132) later refers to “a large coarse piece in good condition ... found by Matheson in a rock-shelter near Middlemarch”, which, allowing for a slight error in the spelling of the finder’s name is probably the same original Mathewson piece, registered in the interim as D34.617. According to Skinner, part of this same cloth is in the Dominion Museum but recent enquiries at the Museum of New Zealand, Wellington, have not been able to locate any sign of it there.

V. Piece of barkcloth in Otago Museum (D 67.2809). This has been in the museum collection with no recorded information other than a note stating “found in Otago” from prior to 1967 when it was registered (Moira White, Otago Museum, pers. comm. 4 September 1993). It measures about 42 cm by 17 cm. Of white colour, it consists of a very soft and thin single layer which is not felted and has many holes. With a fairly close texture, it appears to be like paper mulberry tapa cloth.

W. In describing a 1951 find by W.J. Kidd of a Maori “medicine bundle” wrapped in dogskins from a hole in a rock in the Lammermoor Range seven miles from Middlemarch, Skinner (1952:131) mentions that on the floor of the niche were later found “some small perished pieces of tapa cloth, the texture of which suggests that they were locally made from the inner bark of houhi (lacebark)”. Although the bundle was presented to Otago Museum, these small pieces of barkcloth found later cannot be located in the collection and were probably never presented.

X. In a note attached to an article by Rowley (1966:108), David Simmons, at that time the curator of anthropology at Otago Museum, mentions a “large roll of hoheria tapa...a single piece of tapa some 12 feet long by 3 feet wide” found in the Middlemarch area. This is possibly the same “length of thin bark cloth about nine feet in length, found in a cave in Central Otago” mentioned by Hamilton (1896a:293) which he at first thought was of Pacific island origin but later considered to be “of Maori manufacture and made from the hohera”. This roll of barkcloth has not been specifically identified subsequently in the Otago Museum collections (Moira White, Otago Museum, pers. comms. 30 August 1993, 15 February 1996, 20 February 1996). It may in fact be the same piece as D34.617 described above under U, simply with the dimensions enlarged.

Y. By far the most spectacular, and happily the best documented find of barkcloth in New Zealand, is the wooden box containing 70 huia feathers, some bunches of red kaka feathers, a wooden awl, some cordage, and various pieces of barkcloth, found in central Otago in 1933 (Otago Museum Annual Report 1934; Phillipps 1963:41; Rowley 1966:108; Skinner 1952:132). The original Otago Museum label for this assemblage, presumably written by H.D. Skinner, reads as follows:

“Box, waka huia, containing 70 huia feathers and 20 bunches of scarlet kaka feathers found in a rock cleft north of the confluence of the Talla Burn and the Clutha River, and east of the Clutha. The box is roughly cut with stone tools and is uncarved. It was wrapped in Otago tapa cloth, made from the inner bark of lacebark (hohera) round which, as an outer wrapping, was a piece of finely plaited mat. The wrappings were securely tied with flax two-ply string. In the box was a wooden awl, the head of which had an inner pad of white tapa and an outer covering of brown tapa. As the huia lived only in the North Island, the feathers must have come to Otago by barter or gift. It seems unlikely that the box was hidden later than about 1820. It represents the most spectacular single find of Maori material ever made in Otago. A single huia should provide 12 feathers. A bunch of scarlet feathers would be attached to the base of huia feathers worn by the Maori at the side of the

head. With the waka huia was found a flax kit (D 33.1893, A and B) and a piece of baleen (D 33.1894) shown in this case. Discovered and presented by Mr G. Rae, Miller's Flat, D33.1892."

Recently, Bill Dacker has reported on information supplied by Larry Paterson and John Shaw, both men who knew George Rae well, that this material was actually found above Craig Flat (Moirá White, pers. comm. 22 February 1996) but this has not been verified.

Simmons (in Rowley 1966:108) has added that the outer covering was a very finely woven cloak with dogskin tags, not a mat as described by Skinner. However, there are now no traces of dogskin tags ever having been attached to this cloak (Moirá White, pers. comm. 22 February 1996). In a photograph of this box with its wrappings published by Phillipps (1963:Plate XIII), the outer wrapping is clearly a portion of a thick woven cloak. Another photograph of the box without its outer wrapping is published here (Fig. 2) to show the shape of the box and the very thin, fine, open-textured piece of barkcloth lining the interior. Rowley (1966: 108) thought that this interior piece of barkcloth appeared to be made from *Hoheria* fibres, but from my examination it could just as well be paper mulberry. This lining piece is unnumbered and measures approximately 35 cm in length and at one point is about 8 cm wide.

The barkcloth wrapping from around the box is registered as D33.1892d and measures 130 cm by 24 cm. This is a very soft, creamy brown, single layered cloth with many branch holes. The texture is smooth and homogeneous with long-grained fibres crossing at a regular low angle. From general examination it could well be paper mulberry, an opinion agreed with by Rowley (1966:108).

One of the items inside the box was a wooden awl (D33.1892f), 15 cm in length and padded at the proximal end with two layers of barkcloth. This pad has white barkcloth underneath and a dark brown barkcloth strip wrapped around this.

In the following year, Mr George Rae presented Otago Museum with a group of additional barkcloth pieces found in the same shelter (D34.961a, b, and c). Because of the fragmentary and rigid nature of these pieces, accurate measurement is difficult. D34.961a in its folded state is approximately 21 cm long and appears to be folded upon itself twice, making the original at least 63 cm long but the whole lump is now rigid. D34.961b is very tattered but is at least 24 cm in one dimension. D34.961c is also very tattered but is at least 20 cm long and probably quite wide (Moirá White, Otago Museum, pers. comm. 27 August 1993). These three fragments have a very similar texture and colour to the barkcloth D33.1892d, which was around the box.

For cultural reasons, this image has been removed.
Please contact Auckland Museum for more information.

Fig. 2. Wooden wakahuia box containing huia feathers and barkcloth lining, found at the confluence of the Talla Burn and Clutha River, Central Otago. Photo: Otago Museum.

Reviewing all of these barkcloth finds from Otago, it has been generally assumed that the apparent *Hoheria* barkcloth was manufactured locally while the possible *Broussonetia* barkcloth was imported into Otago, either from the North Island of New Zealand or even from the Pacific islands. However, in the absence of reliable techniques for distinguishing barkcloth made from *Hoheria*, *Broussonetia* or other trees, there are far too many unresolved questions about these New Zealand barkcloth finds to allow any definite conclusions. These finds cannot add anything to knowledge about the geographical distribution of the trees involved. To the contrary, they indicate the strong possibility of long-distance transport of raw materials for particular purposes. Our further inability to distinguish plain barkcloth made of *Broussonetia* in New Zealand from cloth made of *Broussonetia* in the Pacific islands renders all questions of possible imports of finished cloth from the Pacific even more problematical.

NEW ZEALAND BARKCLOTH BEATERS

In central and eastern Polynesia, the most common word for a barkcloth beater is “*ike*” or its cognate “*i’e*”. In New Zealand Maori, the transitive verb “*ike*” and its compound “*paike*” mean to strike with a hammer or other heavy implement (Williams 1971:76). Among many Maori terms for beaters of various sorts, such as *kuru*, *patu*, *tuki*, *ngahiri*, *morenga*, *paoi*, *takaukau*, and *toi*, for actual barkcloth beaters, Williams (1971:255, 271) gives only “*pato*” and “*paku*” as nouns meaning “a maul or pestle for beating fernroot, aute, etc.” In the traditional account of Kahungunu’s use of aute cloth (T above), the beater used in its manufacture is called a *paoi*, but this is also a general term for any wooden beater. Despite their lack of specific reference, these are the only terms known to be applied to aute beaters in New Zealand. In his study “Introduction to Maori Pounding Implements” Phillipps (1939) did not come across any other terms for barkcloth beaters. Elsdon Best did use the term “*patu aute*” to describe a putative barkcloth beater in a manuscript artefact collection inventory but one suspects that he coined this term himself.

In order to identify barkcloth beaters in New Zealand Maori collections, a working set of criteria had to be established to distinguish barkcloth beaters from other similar wooden beaters such as fernroot beaters, carving mallets, and *patuki*. By extrapolation from Pacific island tapa beaters, these criteria were defined in order of importance as:

- (i) longitudinal parallel grooves on at least one facet of the beater,
- (ii) flat, reasonably parallel sides,
- (iii) usually a squared or rectangular cross-section, possibly with some rounding at the edges, and
- (iv) a reduced diameter handle marked off from the beating facets by a shoulder.

The criterion of longitudinal parallel grooves is the only essential one but the other criteria are usually present to some degree. Consequently, fernroot beaters are excluded by their lack of grooves, their converging sides, a usually rounded cross-section and no definite shoulder between beater portion and handle. Carving mallets lack the grooves but often do follow the other three criteria to some extent. However, their pattern of wear from striking the chisel handle is very obvious and their rectangular cross-section is usually very flattened. *Patuki* lack the longitudinal grooves but their sides are usually covered with a surface decoration of carving motifs, their cross-section is usually diamond-shaped sometimes with slightly concave sides, and their sides converge to a definite point at the distal end.

Apart from the above categories of beaters, another category of Maori wooden beater occurs in museum collections with much greater frequency than obvious barkcloth beaters but is not nearly as common as standard fernroot beaters. This category consists of small,

lightweight beaters, similar in size to the known Maori barkcloth beaters and sharing all of their criteria except for the longitudinal grooves. All of the beating facets on this category of beater are finished as a smooth surface. They may be a variety of fernroot beater or intended for some other form of food preparation or fibre treatment. However, their close similarity to Maori barkcloth beaters some of which also have up to three smooth sides, does raise the possibility that these totally smooth-sided beaters were also barkcloth beaters. Tapa beaters with all beating facets smooth without any grooves are recorded from Samoa and Hawaii (Kooijman 1972:104, 289), while tapa beaters with one or more facets ungrooved are widely found in Easter Island, Fiji, Hawaii, Mangareva, Niue, Samoa and Tonga. In Samoa, the beater with all facets smooth is called an *i'e mole* (Buck 1930:289). In Fiji, Hawaii and Samoa, it is recorded that the smooth surface of the beater was used last in the beating process, to produce the finest textured effect on the cloth (Kooijman 1972:108, 352; Neich 1985:43). More research on this category of New Zealand beater is required, perhaps with a microscopic examination for any residues on their beating surfaces. Beaters of this category have not been documented for the present study.

Maori collections in public museums in the following places have been checked personally for any previously unrecognised Maori barkcloth beaters: Auckland, Cambridge, Christchurch, Dargaville, Dunedin, Gisborne, Hamilton, Holdens Bay at Rotorua, Houhora, Invercargill, Kaeo, Kaikohe, Kaitaia, Matakoho, Napier, Nelson, New Plymouth, Okain's Bay, Paeroa, Palmerston North, Papakura, Rotorua, Russell, Tauranga, Te Awamutu, Thames, Waihi, Waipu, Whakatane, Whanganui, Whangarei, Wellington, Whitianga. In addition to these museum collections, I have also checked the artefacts from the Kohika site near Whakatane, the Murdock private collection at Hikutaia, and the national "Y" and "Z" registers of Maori artefacts. Many overseas museum collections have also been personally checked in Great Britain, Australia, Hawaii, United States of America, and Europe. I have also had access to the records of Maori collections in North America and Europe compiled by D.R. Simmons at Auckland Museum.

A purported small stone barkcloth beater from Tairua on the Coromandel Peninsula was reported by Simmons (1978:14) which he claimed "indicates that barkcloth was made in New Zealand from about AD 1000". On examination, this item (Auckland Museum number 18,813) has proved to be a small cylinder of fine-grained tuff or calcareous mudstone covered with low relief stylised faces and cross-hatched surface decoration, of no known date or archaeological context. It is not a barkcloth beater. Simmons's comparison of this item to supposed stone or ceramic tapa beater fragments from Tonga, presumably those reported by Skinner (1966), is also invalid, since these had been demonstrated by Key (1969) to be fragments of discarded modern oven bricks.

Only one purported New Zealand barkcloth beater has been reported in a museum collection outside New Zealand. This was published by Simmons (1982:277) as being in the collection of the Buffalo Museum of Science, Buffalo, New York State, registration number 40124, the result of an exchange with Auckland Museum in 1940. Simmons described this beater as "Finely grooved on four sides, round handle, square body. Length 41.2 cm." However, information supplied by Kevin Smith, Associate Curator of Anthropology, Buffalo Museum of Science (Pers. comm. 8 February 1996) has confirmed that this beater was previously Auckland Museum registration number 18447.10, recorded in both Auckland Museum and Buffalo Museum catalogues as coming from Rurutu in the Austral Islands. It can therefore be definitely excluded from the corpus of known New Zealand barkcloth beaters.

By applying the four distinguishing criteria outlined above, the following Maori barkcloth beaters have been identified. All of the wood identifications have been carried out by

Dr Rod Wallace, Department of Archaeology, University of Auckland, using microscopic analysis of a stained sample, unless otherwise stated. The localities where these beaters were found have been plotted on the map (Fig. 1) referenced by the Roman numeral assigned to each beater.

I. Te Puna, Tauranga (Fig. 3)

Locality: Te Puna, Tauranga. No other information available.

Repository: Te Amorangi Museum, Holden's Bay, Rotorua.

Museum registration number: 2491.

Provenance: Presented to Te Amorangi Museum by Mr Thomas Tu of Te Puna, Tauranga in October 1964.

Weight: 655.5 g.

Size: 33.5 cm long, 6.3 cm wide. Beating facets 23 cm long, 6 cm wide.

Wood: Kauri (Dr R. Wallace, pers. comm. 12 July 1993). Tauranga is just within the geographical growth range of kauri.

Description: All four beating facets with longitudinal grooves. Dark brown colour. Patinated, battered, worn surface. Tapered handle. Low shoulder between handle and beater portion. Beater portion has rounded square cross-section with no break in grooves around the total circumference of the cross-section. Beater facets parallel but slight bulge at middle. Longitudinal grooves wide and ridges rounded. Same gauge grooving on all facets with three grooves per centimetre and 11-12 grooves on each beater facet. Almost certainly made by stone tools.

References: Not previously published.

II. Warea, Taranaki (Fig. 4)

Locality: Found in swamp adjacent to Tapuinikau pa, near Warea. Tapuinikau pa was a major position for the Nga Mahanga hapu, the Patu Kai hapu and the Ngati Moeahu hapu of the Taranaki tribe. In the early nineteenth century, it was assaulted by northern raiders under Murupaenga. The main pa occupies a prominent westernmost hill with a series of ditches and scarps around the northern side and two other defended areas further up the ridge (Prickett 1990:36). The beater is said to have been found right at the foot of the pa, in the upper end of a farm drain. Other artefacts such as a storehouse threshold carving, spear, digging stick, and adze haft have been found in the same swampy area. Now known as the Donald swamp, this swampy area was named Kiakia in an early surveyor's notebook.

Repository: Taranaki Museum.

Museum registration number: A 67.154.

Provenance: Found by Mr J. Donald in 1967. Presented to Taranaki Museum in May 1967 by Mr Donald.

Weight: 290 g.

Size: 30.5 cm long, 4.5 cm wide on broad side, 3.6 cm wide on narrow side. Beating facet 16.5 cm long, 3.6 cm wide.

Wood: Totara or rimu (Wallace 1989:226).

Description: Four beating facets, only one with grooves. Light brown colour. Very carefully-made, well-shaped and finely-finished with signs of wear on the handle and some decay at the butt. Flat ridge 2 cm wide around butt, with shoulder to handle. Slightly tapered handle with rounded 3.5 cm maximum square cross-section. Sharp shoulder between handle and beater portion. Beater portion has rectangular cross-section, 4.5 cm wide and 3.6 cm wide, with grooves on one narrow side only. The other three facets are smooth. All facets are parallel with edges between them rounded. Distal end convex. Single narrow facet with pattern of

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Figs 3-5. Maori barkcloth beaters. 3. I, Te Puna, Tauranga. 4. II, Warea, Taranaki. 5. III, Waikato.

longitudinal grooves interrupted by four sets of diagonal grooves, the central two sets in form of triangular chevrons. Longitudinal grooves are deep and straight-sided with flat-topped ridges between, about same width as depth, three grooves per centimetre. The diagonal grooves are much shallower, incised into a flat surface which has been left raised between the longitudinal grooved areas.

References: Day 1984:16.

Discussion: This pattern of longitudinal and diagonal grooves is unique among New Zealand barkcloth beaters. It recalls the patterned bone lacebark beater described by Hammond at Hokianga (Hamilton 1896:273) and may be compared with a diamond-patterned tapa beater from Tubuai and beaters with various patterned facets from Hawaii (Kooijman 1972:75, 107 ff). If this Warea beater indicates that *Broussonetia papyrifera* was being grown in the Warea district, then this constitutes the only record for aute growing in Taranaki. However, Hamilton (1896:293) did make an unreferenced remark that “older Taranaki people speak of it [aute] having been grown there in their fathers’ time”.

III. Waikato (Fig. 5)

Locality: Probably Waikato but no definite information.

Repository: Te Awamutu Museum.

Museum registration number: 684-154.

Provenance: No information available.

Weight: 421.4 g.

Size: 28 cm long, 6.5 cm wide. Beating facet 12 cm long, 4 cm wide.

Wood: Kauri (Dr R. Wallace, pers. comm. 12 July 1993, by hand specimen examination only).

Description: Four beating facets, one smooth, other three with longitudinal grooves. Dark brown patinated wood with large splits. Handle worn from use. Ridges of beating facets worn shallow, ridges flattened down. Grooves filled with black detritus and plant fibres. Tapered handle. Low shoulders between handle and beating facets. Beating section has rounded square cross-section, with smooth side convex. Junction of edges between beating facets is rounded. Slight longitudinal taper on all facets. Three grooved facets with fine longitudinal grooves, all at same gauge, 3-4 grooves per centimetre and 13-14 grooves per facet. Cutting of grooves and shaping of beater looks like stone-tool work. Modern hole drilled in handle.

References: Not previously published.

IV. Waikato/Te Awamutu (Fig. 6)

Locality: Probably from Waikato/Te Awamutu area.

Repository: Wagener Museum, Houhora.

Museum registration number: 5268.

Provenance: Part of a private collection from the Waikato area purchased for the Wagener Museum.

Size: 26.5 cm long, 7 cm wide. Beater section 16 cm long.

Wood: Kauri (Dr R. Wallace, pers. comm. 9 June 1994).

Description: Three beating facets, one smooth, two with longitudinal grooves. Light brown wood with fine clean grain. Black patina on some areas of surface. Foliating splits with open pithy area down centre. Much of one side of handle split away. Very steep shoulder between handle and beater section. Much of the beater section has split away, leaving the original cross-section unclear but suggesting almost a hexagonal cross-section. One beater facet smooth. Two adjacent beater facets with longitudinal grooves running full length of facet. Grooving slightly closer together on one facet but both about three grooves per centimetre. Cuts across

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Figs 6-8. Maori barkcloth beaters. 6. IV, Waikato/Te Awamutu area. 7. V, Waikato/Te Awamutu area. 8. VI, Kaipara Harbour.

the grain look like stone-tool work.

References: Not previously published.

Discussion: The most interesting feature of this beater is its unusual cross-section, unfortunately marred by splitting and wood-loss.

V. Waikato/Te Awamutu (Fig. 7)

Locality: Probably from Waikato/Te Awamutu area.

Repository: Wagener Museum, Houhora.

Museum registration number: 5269.

Provenance: Part of a private collection from the Waikato area, purchased for the Wagener Museum.

Size: 29 cm long, 5.5 cm wide. Beater section 15 cm long.

Wood: Kauri (Dr R. Wallace, pers. comm. 9 June 1994).

Description: Three beating facets, all with longitudinal grooves. Light brown wood with dense fine grain. Splits. Does not look like a swamp find. Slight knob on butt. Slight shoulder between handle and beater section. Beater portion with rounded, almost triangular cross-section. Longitudinal grooves at slightly different gauge on each facet; two grooves per centimetre on first, three grooves per centimetre on second and slightly more than three per centimetre on third.

References: Not previously published.

Discussion: The rounded, almost triangular cross-section of this beater is unique among all other New Zealand barkcloth beaters, although it does occur occasionally within the wider Pacific, such as Fiji and Samoa (Kooijman 1972; Tolstoy 1994).

VI. Kaipara Harbour (Fig. 8)

Locality: Found with part of the handle exposed in mud at low tide, Wainonororo Creek, Whakaki River, Kaipara Harbour. Barkcloth beater VII was found at the same locality but at a different time. Adzes and sinkers have often been found around these beaches (Mr Colin Brown, Kerikeri, son-in-law of finder, pers. comm., 25 March 1994).

Repository: Okain's Bay Maori and Colonial Museum, Bank's Peninsula.

Museum registration number: Y789 in Antiquities National Register.

Provenance: Found by local farmer, Geoffrey V. Linnell, Oneriri Road, Kaiwaka in about the 1950s. Purchased at Dunbar Sloane's auction, Wellington, 26 May 1994.

Size: 23.8 cm long, 4.7 cm wide. Handle 6.2 cm long.

Wood: Kauri (Dr R. Wallace, pers. comm. 9 June 1994).

Description: Two beating facets with longitudinal grooves, other curved surface smooth. Dark brown dense wood with shiny patina. All very worn and much-used. Enlarged butt knob. Definite sharp shoulder between handle and beating portion. In cross-section, the beating portion has two grooved sides at angle of about 50 degrees, joined by smooth circular section. One grooved facet is 14 cm long, 3.7 cm wide, the other is 14 cm long, 3 cm wide. Both sets of longitudinal grooves are shallow and same gauge, about five grooves per centimetre. There is possibly very shallow, irregular grooving on the smooth face. There are very sharp cuts across the grain around the shoulders which may almost suggest metal-tool work. A very well-shaped and finished artefact.

References: Not previously published.

Discussion: This form of cross-section is most unusual among barkcloth beaters, both in New Zealand and elsewhere. Along with the fine gauge of the grooving, this suggests that beater VI is a very specialised type of artefact.

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Figs 9-11. Maori barkcloth beaters. 9. VII, Kaipara Harbour. 10. VIII, Whangarei. 11. IX, Whangarei.

VII. Kaipara Harbour (Fig. 9)

Locality: Found exposed in mud at low tide, Wainonororo Creek, Whakaki River, Kaipara Harbour. Barkcloth beater VI was found at the same locality but at a different time (Mr Colin Brown, Kerikeri, son-in-law of finder, pers. comm., 25 March 1994).

Repository: Auckland Museum.

Museum registration number: 49957, Y788 in Antiquities National Register.

Provenance: Found by local farmer, Geoffry V. Linnell, Oneriri Road, Kaiwaka, in about the 1950s. Purchased at George Walker's auction, Auckland, 1982.

Weight: 205.1 g.

Size: 25.5 cm long, 4.5 cm wide, beater section 16 cm long.

Wood: Kauri (Dr R. Wallace, pers. comm. 12 July 1993).

Description: One beating facet with definite longitudinal grooves, other three facets with possible grooves but very waterworn. Handle broken away at end. Large *Teredo* worm borings. Light brown, close-grained wood. Tapered circular-sectioned handle, offset toward side with prominent grooves. Definite shoulder between handle and beater section with large rough cuts across the grain. Beater section is slightly rectangular in cross-section with rounded edges. Slight longitudinal curve to whole beater with main grooved facet, 16 cm long by 4 cm wide, on outer curve. Grooves very shallow and worn, about two to three grooves per centimetre. Distal end of beater cut off at angle with irregular cuts. This beater has the appearance of stone-tool work but its waterworn condition precludes a definite determination.

References: Not previously published.

VIII. Whangarei (Fig. 10)

Locality: Found with beater IX. "Recovered during dredging operations in the Hatea River, (headwaters of Whangarei Harbour) in May, 1923. They were found close together, about six feet deep, in an old gravel bed which is covered by the tide at high water. From a geological view point, I should say that these relics had been carried down by floods from one of the upper valleys not less than 400 years ago." (W.M. Fraser, in Buck 1924:37).

Repository: Auckland Museum.

Museum registration number: 8083.

Provenance: Found by Mr W.M. Fraser, Harbour Board Engineer, Whangarei in May 1923. Presented to Auckland Museum by Mr W.M. Fraser in 1924.

Weight: 203.0 g.

Size: 27.3 cm long, 4.7 cm wide, beater section 9.5 cm long.

Wood: Kauri (Wallace 1989:226).

Description: Two opposed beating facets with longitudinal grooves, other two facets smooth. Light brown wood covered with powdery green and white precipitate. Curved longitudinally with the grain, perhaps as a result of uncontrolled drying. Large rough hole pierced through distal end. Handle circular in cross section, tapering from 3.4 cm diameter at shoulder to 1.9 cm diameter at butt. Definite shoulder between handle and two beating facets, smooth junction between handle and smooth facets. Beater section rectangular 4.5 cm by 3 cm in cross-section at shoulder, expanding to 4.5 cm square cross-section at distal end. Opposed beating facets parallel to each other, opposed smooth facets diverge to expanded end. Shallow straight longitudinal grooves at same gauge on both facets, about four grooves per centimetre. Extra grooves added to fill expanded surface towards end. Distal end of beater projects with four-sided pyramidal appearance.

References: Buck 1924:34-37.

Discussion: Buck thought that the wood of this beater looked like manuka but Wallace has

identified it definitely as kauri, the same wood as the other beater found with it. A delicate, carefully finished artefact.

IX. Whangarei (Fig. 11)

Locality: Found with beater VIII as described in previous entry.

Repository: Auckland Museum.

Museum registration number: 8084.

Provenance: Found by Mr W.M. Fraser, Harbour Board Engineer, Whangarei in May 1923. Presented to Auckland Museum by Mr W.M. Fraser in 1924.

Weight: 402.8 g.

Size: 31.4 cm long, 5.3 cm wide. Beater portion 17 cm long.

Wood: Kauri (Wallace 1989:226).

Description: Three beating facets with longitudinal grooves, one facet smooth. Light brown wood, very straight grain, with some surface splitting and flaking due to rapid drying. Very slight longitudinal curve with main beating facet on outer convexity. Signs of wear. Definite sharply-cut shoulder between handle and beater portion. Handle circular in cross-section tapering from 3.5 cm diameter at the shoulder to 2.5 cm diameter at the butt. Beater portion rectangular in cross-section with rounded edges. Main beating facet is 17 cm long and tapers from 5 cm wide at distal end to 3.6 cm wide at shoulder, with longitudinal grooves five per centimetre, fine and regular for the length of the facet. Smooth facet opposite this with same dimensions. Other two opposed facets are both about 3.5 cm wide with no noticeable taper. The longitudinal grooves on these two facets are very lightly incised into the smooth surface and are quite irregular. Buck (1924:36) reported that these grooves were spaced at five per centimetre on one facet and four per centimetre on the other. The distal end of the beater is cut off almost square.

References: Buck 1924:34-37.

Discussion: This is a finely-finished, well-balanced artefact able to impart considerable force and weight to its impact.

X. Whangaruru, North Auckland (Fig. 12)

Locality: Found during very low tide, well off-shore in the mudflats of Tuparehuia Bay, Whangaruru Harbour (M.K. Lamont, son of finders, pers. comm., 9 November 1995). There are numerous pa sites and other evidence of Maori occupation in this area.

Repository: Auckland Museum.

Museum registration number: 45305.

Provenance: Found in 1972 by Mr and Mrs J.N. Lamont, who presented it to Auckland Museum later that year.

Weight: 609.4 g.

Size: 34.9 cm long, 6.1 cm wide on broad side, 5.2 cm wide on narrow side. Beater portion 21.3 cm long.

Wood: Kauri (Wallace 1989:226).

Description: All four beating facets with longitudinal grooves. Light brown wood, deeply split and surface blackened and scaled from shrinkage caused by rapid uncontrolled drying. Signs of wear on some faces and edges. Round cross-sectioned handle, 3.2 cm diameter, offset towards one corner of the beater cross-section. Definite sharp shoulder between handle and beater portion. Beater portion has rectangular cross-section with sides 5.2 cm, 6.0 cm, 6.1 cm in width. Edges rounded. Beater facets parallel. Longitudinal grooves are shallow in section with flattened ridges between. Grooves all same gauge on all four facets, about five per

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Figs 12-14. Maori barkcloth beaters. 12. X, Whangaruru. 13. XI, Waiuku. 14. XII, Auckland City.

centimetre. Cut off square at distal end. Probably stone tool work, judging from the irregularity of the cuts across the grain at the shoulders.

References: Not previously published.

Discussion: One of the larger beaters in the corpus, with an exceptionally large area of beating surface, all at same gauge of grooving.

XI. Aka Aka, South Auckland (Fig. 13)

Locality: Recovered totally waterlogged from mud in the bed of the Aka Aka Stream behind the old dairy factory at Aka Aka, 5 km south-east of Waiuku by Mr G.A. Holmes in 1961 while operating a dragline for the local drainage board (Mr G.A. Holmes, pers. comm., 20 October 1995). This is an area of low-lying swampy river flats, crossed by the meandering Aka Aka Stream on its way to join the Waikato River.

Repository: Auckland Museum.

Museum registration number: 36234.

Provenance: Presented to Auckland Museum by Mr G.A. Holmes of Aka Aka in 1961. A hinaki and a pumice bowl were presented by Mr Holmes at the same time, found nearby in the Aka Aka Stream but not from the same site as the barkcloth beater.

Weight: 527.9 g.

Size: 31.4 cm long, 5.1 cm wide. Beater portion 19 cm long.

Wood: Kauri (Dr R. Wallace, pers. comm. 12 July 1993).

Description: Four beating facets, all with prominent longitudinal grooves. Dark brown colour. Light-weight, close-grained wood with sound surface and only minimal splitting. Grooves very fresh with little sign of wear but handle smoothed from use. Butt rounded. Proximal end of handle flared. Definite small shoulder between handle and beater portion. Handle circular in cross-section tapering from 4 cm diameter at shoulder to 3.2 cm diameter below flared butt. Beater portion quadrangular in cross-section with slightly rounded edges. Beater facets 5.1 cm, 4.6 cm, 4.5 cm and 3.7 cm wide. Longitudinal grooves deep with high rounded ridges between. Three grooves per centimetre on all beater facets. Distal end of beater slightly convex.

References: Not previously published.

Discussion: Outstanding as the most elegantly-shaped and most highly-finished among all other Maori barkcloth beaters.

XII. Auckland City (Fig. 14)

Locality: Dug up in excavations for Vulcan Building, Queen Street, Auckland.

Repository: Auckland Museum.

Museum registration number: 2935.

Provenance: Presented to Auckland Museum by Mr A. Turner in 1928.

Weight: 751.1 g.

Size: 37 cm long, 7.6 cm wide.

Wood: Kauri (Wallace 1989:226).

Description: One small longitudinally-grooved beating facet on short length of one side. Light brown wood in solid condition with some surface splits and flaking. Slight curve to handle with beating facet on outer arc of curve. Irregular shape with minimal shoulder between handle and beater portion. Enlarged butt. Handle sub-circular in cross-section tapering from 5 cm diameter at shoulder to 3.8 cm diameter at butt. Beater portion irregular in cross-section, basically very rounded triangular but with knotted grain enlargement at distal

end. Longitudinal grooved beating facet 9 cm long by 4 cm wide but distal extension of grooving destroyed by recent cuts. Three grooves per centimetre.

References: Not previously published.

Discussion: One of the most irregularly-shaped of the New Zealand barkcloth beaters and closer in form to a fernroot beater than the others. The irregular shape, minimal shoulders and the small area of grooved beater facet may suggest that this implement was originally conceived as a fernroot beater and only later converted into a barkcloth beater.

XIII. Unlocalised (Fig. 15)

Locality: Not recorded.

Repository: Auckland Museum.

Museum registration number: 3148.

Provenance: Vaile Collection, which means that it was purchased from a private vendor, in 1929, with funds provided by the Edward Earle Vaile Trust Fund. Searches for more information in museum archives have been unsuccessful.

Weight: 282.6 g.

Size: 29 cm long, 5.6 cm wide. Beater facet 12 cm long.

Wood: Kauri (Wallace 1989:226).

Description: One longitudinally-grooved beating facet. Light brown wood with numerous splits. Signs of wear on handle. Enlarged irregular knob, 6 cm long, on butt with edge-notching and possible indication of a rudimentary face. Circular-sectioned handle continuing without any definite shoulder into beating portion. Rounded flat cross-section to beating portion with some flattened facets. Irregular, widely-spaced longitudinal grooves, two per centimetre, on flat facet with no definite boundary to grooved area. Wide flat ridges between the grooves. Distal end bulbous with sharply-cut facets suggesting metal-tool cuts.

References: Not previously published.

Discussion: This implement is distinguished from all the other barkcloth beaters by the deliberately-shaped butt enlargement. However, in terms of its irregular shape, longitudinal grooves confined to limited area of a side, and lack of definite shoulders, there is an obvious affinity with beater XII.

XIV. Lake Mangakaware, Waikato (Fig. 16)

Locality: Found with many other wooden artefacts in the mud on the bed of Lake Mangakaware, in the vicinity of pa site MA 1, one of three prehistoric Maori swamp fortifications on the shores of Lake Mangakaware (Bellwood 1978:50, 51, 52, Fig.20). This lake is situated 20 km south-west of Hamilton and 13 km north-west of Te Awamutu. The Mangakaware area was settled by the Ngati Puhiaawe, a branch of Ngati Apakura, traditionally sometime after A.D. 1500.

Repository: Waikato Museum.

Museum registration number: 1972/103/106. (MA 203 in excavation report, Bellwood 1978).

Provenance: Recovered in April 1969 by members of the Waikato Archaeological Society under the direction of Mr D. Pick. Then passed on to the Waikato Museum by Peter Bellwood and the Department of Anthropology of Auckland University in 1972.

Weight: 270.5 g.

Size: 26.2 cm long, 5.3 cm wide.

Wood: Branch matai (Dr R. Wallace, pers. comm. 12 July 1996).

Description: Small portion of one facet bears longitudinal grooves. Very light-coloured brown wood with dark grain inclusions. Burnt on one side, otherwise sound. Cuts very fresh.

For cultural reasons, these images have been removed.
Please contact Auckland Museum for more information.

Figs 15-16. Maori barkcloth beaters. 15. XIII, unlocalised. 16. XIV, Lake Mangakaware.

Slight longitudinal curve. No definite shoulders between handle and beater portion. General expansion in diameter towards distal end. Circular-sectioned handle with expanded butt 3.3 cm wide. Beater portion irregular in cross-section but with four definite flat facets and rest rounded. Four or five longitudinal grooves about 10 cm long on restricted area of one facet only. Grooves very shallow with low flat ridges between. Four grooves per centimetre.

References: Bellwood 1978; Davidson 1984:Fig.74c.

Discussion: This artefact has previously been described in the literature as a fernroot beater but the presence of longitudinal grooves clearly identifies it as a barkcloth beater. It is the only New Zealand barkcloth beater found in association with a controlled archaeological excavation which yielded a radiocarbon dating within the sixteenth and seventeenth centuries for the occupation of the Mangakaware pa sites (Bellwood 1978:71).

MAORI BARKCLOTH BEATERS IN COMPARATIVE PERSPECTIVE

The preferred wood for making these barkcloth beaters was almost exclusively branch heartwood of the New Zealand kauri (*Agathis australis*), except in areas completely beyond or on the borders of the geographical growth range of kauri (Ecroyd 1982:22-23) where rimu or totara and matai were substituted. Kauri branch heartwood is considerably denser than trunk wood and is almost totally impregnated with a hard resin. Wherever it was available, it was the preferred wood for fernroot beaters, mauls, weapons and barkcloth beaters (Wallace 1989:223). New Zealand kauri wood is not distinguishable, by the techniques used here, from wood derived from other species of the tropical conifer *Agathis* which are found in New Caledonia, Fiji, Vanuatu, Solomon Islands, Queensland and Papua New Guinea (Whitmore and Page 1980). But *Agathis* does not occur in tropical Polynesia. On this basis, the identification of wood in a New Zealand barkcloth beater as kauri rules out any possibility that the beater may be an import from tropical Polynesia.

For the beater from Taranaki which is well beyond the growth range of kauri, rimu or totara was substituted. The only other timber used was branchwood matai (*Prumnopitys taxifolia*) for the Mangakaware barkcloth beater in the Waikato which is an overlap area for the southern boundary of natural kauri distribution. Therefore, this single use of matai may have been a substitution for the preferred but unavailable kauri, although matai was also a preferred timber for artefacts requiring a strong dense hardwood (Wallace 1989:227).

The most noticeable characteristic of this corpus of New Zealand barkcloth beaters must be their sheer diversity of form, if viewed in comparison to the regularities of form encountered within each of the tropical Polynesian island culture areas. This is especially apparent when their cross-sections and placement of grooved beating facets are compared.

Nevertheless, there are some regularities of form among New Zealand barkcloth beaters. All have a clear distinction between handle and beater portion, always with different cross-sections for handle and beater. None have a completely circular cross-section for the beater portion and consequently there are always distinct beating facets. On some individual beaters, these beating facets display such differences as smooth versus grooved or variations in gauge of grooving. Other regularities might be based on presence or absence of a butt enlargement, sharpness of shoulders between handle and beater portion, and degree of taper in the overall form of the beater.

When these distinctive features are plotted on a table (Table 1), a useful summary of beater features is produced. From this summary, a typical form of New Zealand Maori barkcloth beater might be characterised as quadrangular in cross-section, shouldered either sharply or gradually between handle and beating portion, often with an enlarged butt, almost

Table 1. Distinctive features of New Zealand barkcloth beaters.

BEATERS FEATURES	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV
Quadrangular X-section	X	X	X				X	X	X	X	X			
Triangular X-section					X							X		
Circular arc X-section						X								
Multi-facet X-section				X									X	X
Sharp shouldered		X		X		X	X		X	X				
Gradual shouldered	X		X		X			X			X	X	X	X
Butt enlargement		X			X	X					X	X	X	X
No butt enlargement	X		X	X			X	X	X	X				
Overall tapered form			X		X			X	X		X	X	X	X
Overall parallel form	X	X		X		X	X			X				
Plain longitudinal grooves	X		X	X	X	X	X	X	X	X	X	X	X	X
Patterned grooves		X												
One facet grooved		X					X					X	X	X
Two facets grooved				X		X		X						
Three facets grooved			X		X				X					
Four facets grooved	X									X	X			
Variation in gauge				X	X				X					
No variation in gauge	X	X	X			X	X	X		X	X	X	X	X

always having only plain longitudinal grooves which are equally likely to be placed on one, two, three or four of the beating facets leaving ungrooved facets smooth, and generally with a constant gauge of grooving on each individual beater.

A plotting of the lengths of these known barkcloth beaters (Fig. 17) indicates that they conform to a fairly limited size range of between 23.8 and 37 cm long, with an average length of 29.5 cm. Also noticeable, when the obviously atypical beater XII is discounted, is the relative constancy of the proportion of beating facet length to total beater length which varies only between 34.7 % and 68.6 %, between 51% and 63% for the majority of beaters.

However, beyond this generalised form there may be significant groupings of barkcloth beater forms based on clusters of distinctive features. In order to gain some idea of whether these features are functionally differentiated or geographically differentiated, their distribution has been plotted on a map of the North Island (Fig. 18). Disregarding the probable influence of numerous other variable factors such as contingency of discovery and multi-function beaters, one would expect that functionally differentiated features would be distributed randomly across the country while regionally differentiated features would cluster in geographical areas.

Unfortunately, the sample size is far too small for any such geographical distribution to be conclusive. However, it does show that quadrangular beater cross-sections are distributed evenly across the full geographical range of New Zealand barkcloth beaters, while triangular and multi-facet cross-sections are limited to the Auckland/Waikato area. Sharp shoulders are

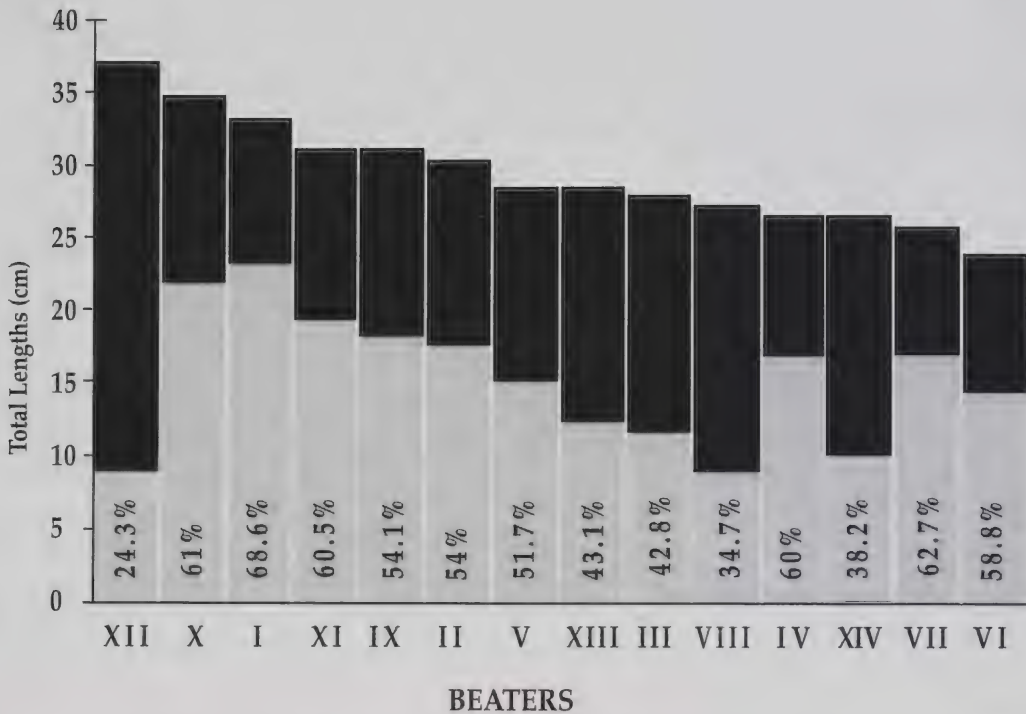


Fig. 17. Lengths of New Zealand barkcloth beaters, showing beating facet as percentage of total.

concentrated in North Auckland, but extend to the Waikato and Taranaki. Gradual shoulders are concentrated in the Auckland/Waikato area with one example each in North Auckland and Tauranga. Enlarged butts are fairly evenly distributed from the Kaipara to the Waikato and into Taranaki. Overall tapered forms are found in North Auckland and again in the Auckland/Waikato region. Overall parallel forms are evenly distributed throughout the barkcloth beater range. Patterned grooves are a unique occurrence in Taranaki, with all the others displaying plain longitudinal grooves. One beating facet beaters are found in the Kaipara/Auckland, Waikato and Taranaki areas. Two beating facet beaters extend from Whangarei to the Waikato, as do three beating facets. Four beating facets are scattered from Whangaruru to Waiuku to Tauranga. Variations in gauge are found only at the two geographical extremes of continuous beater distribution.

On the basis of these distinctive features, some categorical groupings of beater forms begin to emerge although there are obviously many different valid ways to group these beaters typologically. Features such as presence or absence of a butt enlargement, overall tapered or parallel form, number of grooved facets, and presence or absence of groove gauge variation seem to be less diagnostic and more random than the obvious simple features of cross-sectional shape and shoulder forms.

The application of these two features of cross-sectional shape and shoulder form creates a useful working typology of all the New Zealand barkcloth beaters, as follows:

Type 1. Quadrangular cross-section, sharp shoulders.

Beaters II, VII, IX, X.

Type 2. Quadrangular cross-section, gradual shoulders.

Beaters I, III, VIII, XI.

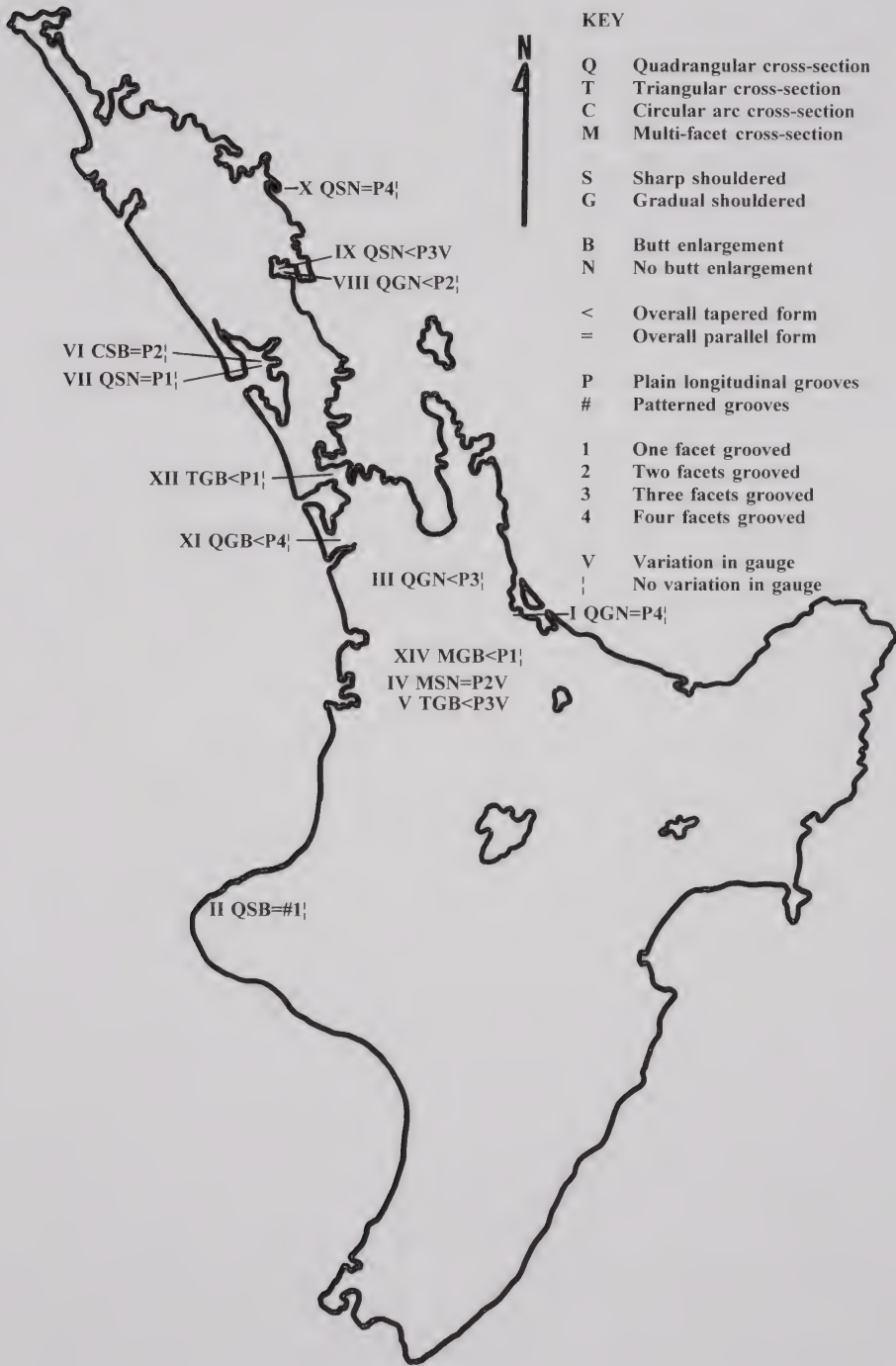


Fig. 18. Map of the North Island showing the geographic distribution of distinctive features of Maori barkcloth beaters.

Type 3. Triangular cross-section, gradual shoulders.

Beaters V, XII.

Type 4. Multi-facet and rounded cross-section.

Beaters IV, VI, XIII, XIV.

Type 4 could be further subdivided on the basis of shoulder form but this is hardly justified with such a small corpus. In terms of their geographical distribution, Type 1 occurs in North Auckland and Taranaki, Type 2 in Whangarei, Waikato and Tauranga, Type 3 in Auckland and Waikato, and Type 4 in Kaipara and Waikato.

Faced with a comparable diversity in early Maori woodcarving styles, Sutton (1987) has suggested the possibility of multiple island origins for Polynesian settlement of New Zealand over a long period of time, in contrast to the usually accepted assumption of a single and comparatively late colonisation. The diversity of barkcloth beater forms in New Zealand may also lend support to the suggestion of multiple origins, but the temporal span of the known New Zealand beaters is more problematical. Some of them may have been retained since last use as family heirlooms in an ethnographic context, but most are reported as having been found, probably implying their recovery from the ground. Only one, the beater from Mangakaware (XIV), has been found in association with a controlled archaeological excavation, providing the earliest date for a New Zealand barkcloth beater, within the sixteenth and seventeenth centuries. Some definite but minimal archaeological context has also been noted for beaters II, VI, VII, VIII, IX, XI, and XII. Beaters II and XI were found in swamps in association with other artefacts of late classical Maori or even post-contact date. Beater XII was dug up from a building site at an unspecified depth. Beaters VI and VII were found in tidal estuarine mud, while beaters VIII and IX came from tidal estuarine gravels reputedly indicating some considerable antiquity. However, in the absence of any better-recorded archaeological contexts or absolute datings for the New Zealand barkcloth beaters, it is not possible on the evidence now available to establish any chronology of stylistic variation for barkcloth beaters such as Sutton has called for in studies of early Maori woodcarvings.

In a wider Polynesian comparative perspective, the New Zealand barkcloth beaters generally have a greater affinity with the straight parallel-sided and fine-grooved beaters of Eastern Polynesia (Tahiti, Cooks, Australs, Marquesas, Hawaii) rather than the strongly-tapered and coarsely-grooved beaters of Central Polynesia (Tonga, Samoa, Niue). Buck (1944:431) came to the same conclusion in an early general comparison of Polynesian tapa beaters, but as he was only aware of the two New Zealand beaters from Whangarei his generalisations can now be considerably refined. The New Zealand beaters of Type 2 show the closest similarity to other tropical Polynesian tapa beaters with their quadrangular cross-sections and gradual shoulders. Indeed, such sharp shoulders as seen on the New Zealand beaters of Type 1 are a definite rarity among Polynesian beaters. Consequently, the contrast in size between handle cross-section and beating portion cross-section so marked on many New Zealand beaters, especially those of Type 1, is not a feature of most tropical Polynesian beaters.

Barkcloth beaters with a triangular cross-section as seen on New Zealand Type 3 barkcloth beaters are very rare in tropical Polynesia, with those from Fiji being the best documented (Kooijman 1972:351). Even more unusual in Polynesian terms are the beaters of New Zealand Type 4 where the cross-section is a complex arrangement of two or three facets at an angle joined by an arc of a circle. New Zealand beater IV is even more remarkable with its remaining three facets and suggestion of an original hexagonal cross-section. On the evidence of presently-known Polynesian barkcloth beaters, the New Zealand Type 4 beater would seem to be a uniquely New Zealand Maori innovation. Or alternatively, it might represent an archaic survival at the periphery of distribution.

Most tropical Polynesian beaters have a proportionally longer beating facet than the New Zealand beaters. Tropical Polynesian beaters are also distinguished from the New Zealand beaters by the fineness of the grooving on the finest facets of the tropical Polynesian beaters. The New Zealand beaters with a maximum of five grooves per centimetre and an average of about three grooves per centimetre never display the extreme fine gauge of grooving as seen on some tapa beaters from Tahiti for example. The diagonal grooves on New Zealand beater II are apparently unique within Polynesia, although suggesting similarities to the patterned beaters of Hawaii.

The prominent butt enlargement marked off from the handle by sharp shoulders on New Zealand beaters II, V, VI, XIII and XIV contrasts strongly with the small flared butt enlargement seen on many ethnographic tropical Polynesian tapa beaters. Beater XI from the New Zealand corpus is the only one that displays this typical tropical Polynesian beater characteristic. Overall, this corpus of New Zealand barkcloth beaters with its butt enlargements and complex of cross-sectional forms might tend to suggest some degree of archaic conservatism at the periphery of diffusion.

COMPARISON OF MAORI AND EARLY HUAHINE BEATERS

These comparisons with ethnographically-recorded, mainly nineteenth century, Polynesian barkcloth beaters can be supplemented by comparisons with the only known ancient Polynesian tapa beaters, those recovered from the archaeological site of Vaito'otia/Fa'ahia on Huahine in the Society Islands. The ancient Polynesian occupation of this site has been radiocarbon dated between A.D.850 and A.D.1200 (Sinoto 1979:21; 1983:71), although Sinoto (1983a:59; 1983b:594) believes that occupation must have begun earlier than this. On the basis of similarities in 'patu' hand clubs, adze blades, shaped whale-tooth pendants and harpoon heads found at Vaito'otia/Fa'ahia, Sinoto (1983:70, 72; 1983a:57, 59; 1983b:596-597) has suggested a link between this Huahine assemblage and archaic Maori material culture in New Zealand. He believes that this link supports his hypothesis of an early sequential initial settlement from the Society Islands to New Zealand. However, while accepting most of the artefact similarities between the Huahine site and archaic New Zealand, Davidson (1984:94) and Sutton (1987:145) have pointed out the considerable differences in adze types.

A comparison of the barkcloth beaters from this Huahine site can now be made with this corpus of New Zealand barkcloth beaters, to examine whether or not they support Sinoto's hypothesis. Complicating this examination is the huge time difference between the Huahine and New Zealand barkcloth beaters, paralleling the similar problem wherein ancient Huahine 'patu' clubs can only be compared with late classic Maori patu since no fighting clubs have ever been recovered from any New Zealand archaic sites.

Photographs and information on the barkcloth beaters from the Vaito'otia/Fa'ahia site and permission to publish them have very kindly been supplied by Dr Y. Sinoto (pers. comms. 24 August 1994, 26 October 1995). Sinoto reports that since 1977, a total of seven wooden barkcloth beaters have now been found during archaeological excavations at this site, six from the controlled excavations and one from dredging. However, because some of these have also been described elsewhere as plain wooden beaters and appear to be so from their photographs, the comparisons in this study will be restricted to those Huahine beaters which clearly qualify as barkcloth beaters on the criteria listed above.

The first barkcloth beater was found in 1977 in the stratigraphic excavation lying alongside a large flattish irregular-shaped stone which was therefore suspected to be a tapa

beating anvil (Sinoto 1979:6, Fig. 13a). Sinoto (1979:8) noted that this was the first wooden tapa beater ever found in a Society Islands settlement period archaeological site. A second beater was recovered by dredging from the small pond adjacent to the section of the site where the first beater was found and others were excavated during later seasons. Sinoto (pers. comm. 26 October 1995) has added that all of these Huahine barkcloth beaters have round to oval cross-sections with no examples of a square cross-section.

Huahine barkcloth beater D22-2 (Fig. 19)

This beater is described as having “vertical grooves and is 43 cm long and 6 cm in diameter at the beating section, with a reduced diameter in the handle” (Sinoto 1979:11). According to Sinoto’s correspondence, the cross-section is round. From its photograph, this beater is seen to have no obvious shoulder between beater portion and handle, and no enlargement at the butt.

Huahine barkcloth beater W41-4 (Fig. 20)

This tapa beater was found in 1984 in excavations on the opposite south side of the same small pond. Sinoto and Han (1985:16) have described it as follows:

“Round in cross-section, the beater is 360 mm long and 68 mm in diameter. The handle is slightly fluted, 29 mm in diameter. Grooves, 3 mm wide, run in a parallel pattern along the longitudinal axis of the beater.”

From its photograph, this beater is seen to be delicately-shaped with wide, scalloped grooves. There is no shoulder between beater portion and handle, but the handle is markedly reduced in diameter. The butt has a graceful flared enlargement.

Huahine barkcloth beater N43-25 (Fig. 21)

Also from the south side of the small pond, this barkcloth beater was excavated from Sinoto’s Layer V. He describes it as 370 mm long and 42-62 mm in diameter with a handle length of 190 mm (Sinoto, pers. comm. 26 October 1995). From its photograph, this beater has a small but definite shoulder between the beater portion and the handle. Damage to the handle has obscured the treatment of the butt although a strongly-reduced handle diameter is apparent. The longitudinal grooves are very regular and cut deep and sharp, in contrast to the broad grooves of the previous beater. The distal end terminates very abruptly with a slight regular convexity.

Huahine barkcloth beater #163 (Fig. 22)

Recovered as a surface find from dredged sands, Sinoto (pers. comm. 26 October 1995) is confident that this beater came from his Layer V. It measures 380 mm long and 70 mm in diameter. From its photograph, this beater shows a slight reduction in diameter towards the distal end, no shoulder between beater portion and handle, and a very slight flared enlargement at the butt. The longitudinal grooves are closely spaced and apparently quite shallow.

As a group in contrast to the New Zealand barkcloth beaters, these Huahine beaters display a fairly consistent form, marked by circular cross-sections with longitudinal grooving all around, little or no shoulder between beating portion and handle, minimal butt enlargement, and relatively fine shallow grooving. Beaters W41-4 and D22-2 vary from this norm in terms of the coarseness of their longitudinal grooves, especially W41-4 which has exceptionally wide grooves. Nevertheless, such variation in groove width is still normal within a range of tapa beaters from one cultural area.

For cultural reasons, these images have been removed.
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Figs 19-22. Barkcloth beaters from the Vaito'otia/Fa'ahia site, Huahine Island, French Polynesia. 19. D22-2. 20. W41-4. 21. N43-25. 22. #163. Photos: Y. Sinoto, B.P. Bishop Museum, Honolulu.

While recognising the smallness of the sample, the Huahine beaters show much less diversity than the New Zealand beaters. Among the New Zealand beaters, only I, III and XI bear a superficial resemblance to the Huahine corpus, but this resemblance is negated by the total contrast in cross-section of the two groups. Obviously, the most noticeable contrast between the two sets of beaters is the exclusively round to oval cross-section of the Huahine beaters and the exclusively quadrangular or multifaceted cross-section of the New Zealand beaters. There are no quadrangular cross-sections among the Huahine beaters and no circular cross-sections among the New Zealand beaters.

Consequently, this mutually exclusive difference between the two sets of barkcloth

beaters does not provide any support for Sinoto's hypothesis of links of similarity between the material culture found in Huahine and New Zealand. However, in view of the time differential between these two assemblages, this difference in artefactual form does not disprove such a link when all the other possibilities of subsequent artefactual evolution and later introductions to New Zealand are considered.

NEW ZEALAND TECHNIQUES OF BARKCLOTH MANUFACTURE

Some very general inferences about the techniques of growing *Broussonetia papyrifera* and making barkcloth from its bark in New Zealand can be gleaned from the various types of information assembled in this study.

Cook, Banks, Parkinson and Colenso (C, D, E, and F above) all write about plantations of paper mulberry with at least six plants and perhaps more, indicating that the plant was carefully cultivated and protected as a crop in areas specially designated for this purpose. Buck (1924:28) quoted a report that the missionaries who arrived in Tahiti on the "Duff" in 1796 found that the paper mulberry cultivations had deep wide ditches dug around them to keep out the pigs. Such ditches would not have been necessary in pre-contact New Zealand without any large herbivores where light fences were sufficient to keep birds like pukeko out of cultivations. Writing generally of the Maori, Colenso (1868:10, 16) commented on the large amount of time and effort that had to be devoted to the cultivation of the main domestic plants, the kumara, taro, hue, and aute, each requiring a different soil. The aute, which was cultivated annually, required a rich soil but less intensive care than kumara and taro. In contrast to this indication of plantation cultivation of paper mulberry, at least one Maori proverb (Buck 1924:33) refers to the planting of a single paper mulberry tree beside a dwelling house. This practice has also been noticed in Western Samoa recently, where trees planted around the sides of the dwelling house provided enough bark for present reduced siapo manufacturing needs.

Banks made it very clear that the Maori in his time were not making large pieces of barkcloth, stating explicitly that; "we never saw peices [*sic*] of it larger than what served to put into the holes they bore in their ears, making an ornament they are very fond of" (Beaglehole 1962:II:9). Banks assumed that Maori made such small pieces because of the scarcity of the paper mulberry tree in New Zealand, but other traditional uses of barkcloth to be described below would indicate that Maori did have the technological knowledge to make larger pieces.

There is absolutely no evidence concerning the sort of barkcloth beating anvil that might have been used in New Zealand. Sinoto (1983:71) has reported a stone tapa beating anvil from the Vaito'otia/Fa'ahia archaeological site in Huahine, apparently identified as such mainly by its proximity to the find of a grooved wooden tapa beater. Kooijman (1972:105, 180, 199) and Tolstoy (1994) have noted the use of stone anvils in Hawaii, the Marquesas and Easter Island, perhaps significantly all eastern Polynesian cultures as is New Zealand Maori originally. Stone anvils would have survived in New Zealand archaeological sites but it is very doubtful if they would have been recognised as such. Judging from the preponderance of wooden beating anvils in most of Polynesia, including Hawaii and the Marquesas, the New Zealand Maori also probably used wooden anvils but again none have been recognised in the archaeological record.

Joseph Banks (Beaglehole 1962 II:9) made the definite observation that just as the tropical Polynesians beat the paper mulberry bark to make cloth, so did the New Zealand Maori "likewise beat it out into cloth". But sadly, neither Banks nor any others of Cook's company elaborated further on the beating process which they probably witnessed in New

Zealand. Nor apparently did they collect any Maori implements used in this process. One wonders whether perhaps some of the frequent early depictions of Maori women beating fernroot were actually mistaken from witnessing the beating of barkcloth. In either case, these depictions probably give a fair indication of how the barkcloth beating process looked to an outside observer.

With reference to the smooth surfaces on the two beaters from Whangarei, Buck (1924:38) suggested this indicated that New Zealand barkcloth was beaten very thin. Taking account of the function of smooth beater surfaces as known in the tropical Pacific Islands (Kooijman 1972:108, 352; Neich 1985:43), that is to flatten out the ridges left by grooved beater facets and to thin the cloth, the presence of smooth beating facets on New Zealand barkcloth beaters probably does indicate that they were used to produce a fine thin cloth.

On the basis of Buck's descriptions of the two barkcloth beaters from Whangarei, Kooijman (1972:93-94) surmised:

"The grooving of these beaters is rather fine, and they therefore resemble the central Polynesian type of *ike* and not the coarsely grooved beaters of Samoa and Tonga. In view of the relationship between the grooving of the beater and the quality of the finished product, it seems likely that the Maori produced a fine, thin tapa comparable to the kinds known from central Polynesia."

Unique among New Zealand barkcloth beaters, the diagonal pattern on the beater from Warea is reminiscent of the patterned tapa beaters from Hawaii (Kooijman 1972:108-109) which were designed to produce a watermark pattern in the finished cloth. Whether the Warea beater produced a similar type of watermark is open to conjecture.

Some very weak evidence for the way in which barkcloth was processed in New Zealand can be drawn from two proverbs recorded and explained by Colenso (1879:145). Both of these proverbs include the phrase "te aute tee whawhea" or "te aute tee awhea" which Colenso translated as "the prepared paper mulberry bark is not blown away (or disturbed) by the winds while drying and bleaching". While accepting that Colenso has clearly read more into these terms than any literal translation, it must be remembered that he may even have witnessed the process during his early days in the Bay of Islands, thereby prompting him to suggest that laying the beaten pieces out to dry and bleach in the sun might have been part of the barkcloth manufacturing process in New Zealand. Laying the beaten pieces of cloth out in the sun or in an open house to dry is a common step in the tapa preparation process in many tropical Pacific islands (Tolstoy 1994). In Savaii, Western Samoa, this stage of the process was observed in 1980 when small basalt lava stones were used as weights to hold the drying tapa in an extended spread and to stop the wind from disturbing the sheets (Neich 1985:48).

Except for the doubtful illustration in Thomas (1995), there is no evidence of pigment or coloured patterning being applied, from which it is assumed that New Zealand barkcloth retained its natural whitish colour. Supporting evidence for this is the Maori preference for very white Pacific island tapa cloth or even white paper in trade, reported by Banks during Cook's first contacts (Beaglehole 1962 I:442).

MAORI ARTEFACTS WITH BARKCLOTH INCORPORATED

A few rare Maori artefacts now in museum collections incorporate barkcloth into their construction. However, in view of the difficulties already noted for distinguishing *Hoheria* from *Broussonetia* barkcloth, and Pacific *Broussonetia* from New Zealand *Broussonetia* barkcloth, the relevance of this incorporated barkcloth is still problematical at present. Nevertheless, for the sake of completeness and for possible future reference, they are described here, as follows:

1. Feather cape with barkcloth backing

Listed as Number 304 in the Sir George Grey collection, this cape is now on deposit in Auckland Museum, registration number 1491. The total construction of this cape is non-traditional in technique and materials, constituting a probably unique artefact (Pendergrast 1987:113:no. 44). Tui tail feathers are attached in rows to a cloth foundation which in turn is backed with barkcloth, which Pendergrast considers to be possibly of eastern Polynesian origin. This tapa backing is a light brown colour, very thin and now brittle, with a very regular cross-hatched pattern of beater impressions on both sides of the cloth. No other provenance or historical information has been recorded for this cape.

2. Awl with barkcloth pad

Otago Museum number D33.1892f. Already described above as being found inside the waka huia from the confluence of the Talla Burn and the Clutha River, Otago, this wooden awl has a pad for protecting the user's hand at the proximal end. This pad consists of two layers of barkcloth, white barkcloth underneath and dark brown, almost red cloth wrapped over this.

3. Manutukutuku kite with barkcloth on facemask

Auckland Museum number 204. Made by a Maori person on the East Coast, Sir George Grey obtained this kite from Wiremu Kingi of Gisborne in 1886. Grey then presented it to Auckland Museum in the same year. The outer layer of the human face constructed on this kite consists of barkcloth moulded to fit the relief shape of the face. Barton (1987:69) who did the most recent conservation work on this kite was sure that this barkcloth was not beaten New Zealand ribbonwood or lacebark, but thought that it could quite possibly be a piece of Maori aute barkcloth beaten from New Zealand *Broussonetia papyrifera*. He did not explain how he distinguished these types of barkcloth. There is also another problem with Barton's suggestion of New Zealand *Broussonetia* being used here. If the kite was made in the mid-1880s, it is most unlikely that the barkcloth was made at that time also, in view of all the information available on the extinction of New Zealand *Broussonetia papyrifera* sometime soon after the 1840s. Perhaps some old New Zealand barkcloth was still available by 1885 but it is much more likely that tropical Pacific tapa cloth was used.

MAORI USES OF BARKCLOTH IN NEW ZEALAND

The presence of barkcloth in the artefacts described above already documents the Maori use of barkcloth in kites, as backing in a cloak, as wrapping for fragile and valuable objects such as huia feathers, as the lining of a treasure box, and as protective padding on a tool, in this case an awl. According to Skinner (1974:82), the pair of archaic chevroned pendants found in a hollow tree at Aniseed, Kaikoura were wrapped in a barkcloth package, but such a juxtaposition of archaic pendants in a late period wrapping raises some awkward questions.

Apart from these usages, by far the best documented Maori use of barkcloth is for decorative rolls worn through a hole pierced in the ear lobe. This usage was described several times by Cook and his colleagues during their first visit to New Zealand on the "Endeavour" (Beaglehole 1955:218; 1962 I:442; 1962 II:9). In fact, Sydney Parkinson's pencil sketches made on this voyage of Maori men wearing barkcloth rolls in their ears constitute the only indubitable visual evidence of what authentic New Zealand barkcloth actually looked like in use.

At Anaura Bay on 22 October 1769, Parkinson sketched two men with rolls of barkcloth through large holes in one of their ears, in both cases with a nephrite pendant hanging below

from the same ear (Joppien and Smith 1985:Illustration 1.107). Then at Queen Charlotte Sound in January 1770, Parkinson sketched three or four men with barkcloth rolls in an earlobe hole (Joppien and Smith 1985:Illustration 1.133). The details are a little unclear but some of these men also have a nephrite pendant suspended from the same ear below the barkcloth roll. At least one other has the barkcloth roll without the suspended pendant.

It is to be noted that only men were depicted wearing these rolls of barkcloth. Judging from the way the barkcloth rolls hold their shape and flare out in Parkinson's sketches, the cloth must have been fairly stiff. It also appears to be plain undecorated and probably white. This usage of barkcloth for ear rolls was the only use for barkcloth recorded in New Zealand during Cook's visits. On Cook's two later visits to New Zealand, locally-made barkcloth is not even mentioned in the journals; there is only one very oblique reference to rolls of cloth (probably Tahitian barkcloth) being worn in slits in ears, and no ear rolls are depicted by the artists on these later voyages. Does this mean that the wearing of barkcloth rolls in ears was only a very ephemeral fashion or was it simply not considered worthy of comment again in these later journals and visual records?

Observations made by the early French visitors to New Zealand add very little to the information recorded from Cook's voyages. Joseph Francois Raoul, chief quartermaster on the "Recherche" off North Cape and Cape Maria Van Diemen in March 1793 listed what he thought might be "material made of mulberry" among the items traded from Maori who came out in canoes (Ollivier 1986:49, 50). Raoul described this material as "ornaments which consist of little plaits of mulberry (?) passed through their ears". Charles Hector Jacquinet, an ensign on the "Coquille" at the Bay of Islands in April 1824 made the general observation that:

Men and women alike pierce their ears and by stretching them make holes that are often four or five *lines* [5/12 of an inch] in diameter. They put various objects through them such as pieces of cloth...

(Ollivier 1986:97)

It is interesting to note that Jacquinet implies that women also wore barkcloth rolls through their ears, contrary to the information conveyed by Cook and his colleagues that only men wore barkcloth ear rolls.

Visual records left by the artists on these early French voyages do not provide any further enlightenment. The only possible indication of barkcloth ear ornaments is seen in the portrait of a Maori man drawn by the artist Piron on board the "Recherche" off North Cape in March 1793. Unfortunately, Piron's original drawing is now lost, leaving only later engravings of this portrait for examination (Ollivier 1986:68-80). These show a large bundle of white fibrous strands hanging down below the man's shoulders from each ear. Because of his thick long hair and beard, the mode of attachment of these ornaments to his ears is unclear, although some versions might suggest that the bundles hang from perforated ear lobes. Collins and Ollivier (in Ollivier 1986:68, 69) have suggested that these ornaments might be narrow strips of tapa cloth, analogous to the "little plaits of mulberry passed through their ears" described by Raoul. Some of the engravings might suggest strips of cloth while others look more like finely plaited strands. If these bundles are indeed barkcloth, it is being worn in a totally different fashion to the small stiff barkcloth rolls through pierced ear lobes as described and drawn by Cook's colleagues.

Some later evidence of barkcloth rolls being worn by men in their perforated ear lobes is provided by the artist Augustus Earle in North Auckland in 1827 to 1828. In his sketches and watercolours (Murray-Oliver 1968:Plates 4, 12, 55), Earle shows men wearing large stiff rolls of white barkcloth, except for one man (Plates 28 and 39) whose ear ornament is a drooping piece of white material, which may or may not actually be barkcloth.

Williams's Maori dictionary (1971:137) gives "kope" and "turuki" as words meaning an "ear ornament made of aute". "Kope" is the word used in the traditional North Auckland account of Kahungunu's ear decoration of aute (T above). In the Marquesas Islands according to Handy (1923:289) identical rolls of white tapa cloth worn in the earlobes were called *koufau*. There they were said to be worn in order to keep the perforation of the earlobe distended. Whether or not this was the purpose of the ear rolls worn in New Zealand is now unknown, but they are generally assumed to have had a decorative function for their own sake, as supported by the comments of Banks and others on the value attached to barkcloth ear ornaments by their Maori acquaintances.

Both Maori and Pakeha commentators on the development of Maori clothing have often assumed that the earliest Maori settlers in New Zealand made or tried to make clothing from paper mulberry barkcloth, just as their forebears had done in the tropical Pacific. This is probably a reasonable and justifiable assumption in view of the fact that these first Polynesian settlers arrived into a cold climate from tropical islands where barkcloth clothing was possibly, but not necessarily, a part of the material culture. And they had brought the paper mulberry plant with them. However, there is no documented material evidence for this assumption, no evidence for how long the making of barkcloth garments might have persisted in New Zealand, and certainly no surviving New Zealand barkcloth garments. There are only the Maori oral traditions, which in this respect may be suspected of later elaboration. Thus, Patiki of Te Aupouri writing before 1851 stated:

"The clothing of the place from where we (our ancestors) sailed from on the "other side" was made of aute, a tree named aute, the bark of which was prepared,..."

(Simmons 1976:221)

Then bringing this knowledge to a New Zealand context, Himiona Tikitu of Ngati Awa related this comment in his account of a tribal battle that occurred about six generations before his time:

"Te Whatu-manu and Te Manawa were kept by Te Rangi-ka-wehea as beaters of aute, for that was the clothing of old, and these two were very clever at that work."

(Best 1898:653)

Similarly, Johannes Andersen (1907:322) claimed that:

"In ancient days, too, garments were made from the bark of the aute tree, such garments being called te kiri o Tane - the skin of Tane, lord of the forests."

These sorts of accounts were possibly stimulated by post-European contact acquaintance with the making of tapa clothing in the tropical Pacific islands. Best (1925a:3) also assumed that the early Polynesian settlers tried to make aute garments in New Zealand, and he then goes on to set up a conjectural evolutionary history in which aute garments are replaced by *Hoheria* bark cloth garments which in their turn were "soon to be abandoned for the more durable and satisfactory garments woven from *Phormium* fibre".

Buck (1924:33) was much more circumspect in his treatment of Maori traditional references to a maro aute in New Zealand. He felt justified to point out that the maro aute worn by Whakatau (Grey 1928:50) probably was truly a maro made from *Broussonetia* barkcloth since Whakatau lived in the Polynesian homeland before the move to New Zealand. At the least, Buck treated this reference as evidence for a Maori remembrance of the Polynesian barkcloth maro, noting at the same time that while the term "maro" was retained by the Maori, the material employed had changed to a plaited form. Consequently, he is sceptical of the mention of a New Zealand maro aute in the chant of Te Aratukutuku (Grey 1853:412).

Williams's dictionary (1971:183) gives "maro" as "a sort of kilt or apron worn by males and females", adding the remark that the maro might be made of various materials other than

aute. In this regard, Tregear (1891:34) lists “a girdle made of aute bark” as one meaning of “aute” but then goes on to list other meanings as “any article made of aute” such as a band or fillet for the hair, or a kite. In the description of Hinepoupou’s maro (Grey 1928:188) recorded by Hori Patara of Ngati Toa in 1851, the Rangitane narrator emphasized that the material was aute, even elaborating with poetic licence that the front of the maro was white and the back was red. In the myths of Maui and his mother Taranga, her maro are described as a maro-whaiapu (a superior maro made of dressed flax) and a maro-waero (made from the hair of a dog’s tail) (Grey 1854:16). The frequency of these detailed descriptions of maro in the traditions indicates that each particular type of maro communicates a strong symbolic significance. Consequently, it is to be expected that the descriptions of maro would continue to be elaborated for symbolic and literary reasons in the ongoing retelling of traditions, almost regardless of the actual clothing worn in the past.

Although with stronger justification, a very similar conjectural structure of assumptions has been built up around the other popular belief of aute usage, that Maori kites were originally made with *Broussonetia* barkcloth. This assumption is apparently based on traditional accounts of kites said to be made of aute barkcloth, such as the kite of Tawhaki on the string of which he climbed to heaven (White 1887:129), the kite of Tamapahore (Maysmor 1990:60-61) and the kite flown by the children of Onekawa pa at Ohiwa (Best 1925b:95), coupled with the later loose generic application of the words “manu aute” to mean a kite in Maori. It must be noted here that Best (1925:78) doubted if “manu aute” was ever used in a general sense or applied to kites made of any other material, contrary to Walsh’s (1912) title. Kites specified as made of raupo are equally common in these traditions. Nevertheless, these two views of Maori aute kites, one embodied in the oral traditions and another in the usage of the words “manu aute” seem to have been mutually supportive, so that the mention of a kite in a re-telling of a tradition about ancient times has then often been explained or glossed as referring to a kite made of aute. Kites made of aute are said to have been especially important for divination based on the kite’s movements during flight (Best 1925:73).

Thus, the most recent study of Maori kites, (Maysmor 1990:7) states; “The first kites made by the Maori in New Zealand were probably constructed in typical central Polynesian tradition, and as such may have been completely covered with aute cloth”. Indeed, kites covered with aute cloth are well attested, at least in historic times, in Hawaii, Tahiti, Marquesas and the Cook Islands, all Eastern Polynesian rather than central. Some commentators have surmised that in New Zealand the aute was woven or plaited, or wound around the body and wings of the kite, or laced on to the kite’s frame in narrow pieces.

It hardly needs comment that there is no material evidence for any of this in New Zealand kites, as Walsh admitted in 1912 (Walsh 1912:377). Indeed, out of seven surviving reasonably authentic Maori kites, only one has any barkcloth incorporated into its construction. This is the kite from the East Coast, now in Auckland Museum (AIM 204), discussed above. Even in this example, the barkcloth is only used as a face covering with no aerodynamic function, and even its identity as New Zealand *Broussonetia* barkcloth is uncertain. The oldest surviving Maori kite, that in the collection of the British Museum (Museum of Mankind 43.7-10.11) dating from 1843 has no barkcloth incorporated into its construction. All of the records of kites actually seen by early observers in New Zealand describe the covering materials as raupo, upoko tangata (or cutty grass), kiekie leaves and kuta leaves (Maysmor 1990:7-10).

In the same way that Best set up a conjectural history for aute garments, so did Walsh (1912:377) suggest a conjectural history for aute on kites, although he was aware of the speculative nature of this history. In Walsh’s scheme, the first kites constructed in New Zealand followed the old Polynesian model with aute in the form of barkcloth stretched on a

frame. Then because of the scarcity of aute, substitute coverings were found in the leaves of raupo or upoko tangata grass. But even in this later development in Walsh's conjectural evolution, the old connection with aute was maintained by making the head of the kite with aute cloth. This conjectured final stage of aute cloth use in kites was derived from the evidence of the sole example of the birdman kite in Auckland Museum. Then, in a final vestige of aute on Maori kites, strips of unbeaten *Broussonetia* inner bark were said to have been used in the same way as raupo leaves. This evolutionary relict was derived from Tutakangahau's account of kite-making in his grandparent's time (Best 1925:73).

Nevertheless, despite the scepticism expressed here, the general association of aute barkcloth with kite manufacture in New Zealand is very strong and can probably be accepted as reasonable evidence for some form of aute kites having been made in New Zealand at some unspecified period prior to European arrival. Mention of kites made of aute or at least incorporating some aute, by such authoritative Maori sources as Wi Maihi Te Rangikaheke of Te Arawa (Maysmor 1990:32) and Tutakangahau of Tuhoe, lend support to this association.

Buck (1924:40) makes the point that because of the limited supply of barkcloth in New Zealand and its association with the old homeland, "sentiment and scarcity increased the value of the prepared article" making it an appropriate vehicle for the wrappings around the emblems of gods and for the ornamental adornment of chiefs. Buck's point certainly seems valid when considering the range of *Broussonetia* barkcloth usages in New Zealand, although these types of usages are also probably those most likely to be remembered and recorded.

Several references describe the role of barkcloth in the ornamental adornment of high-ranking people, either in their ears, in their hair, on their person, or even perhaps on their symbols of authority. The evidence for ear rolls of barkcloth has been reviewed above, worn by men only, who were presumably of some degree of rank. Barkcloth worn in the hair has been mentioned frequently. Thus Colenso (1868:10; 1880:18) tells us that beaten *Broussonetia* barkcloth was made into "cloth-like fillets for the hair of the chiefs", probably to tie up their tikitiki or topknot. Percy Smith (in Brigham 1911:17) even describes Maori use of a fine gauze-like white piece of New Zealand *Broussonetia* barkcloth worn around the head in a turban form with flowing ends. Smith's description of this form of Maori dress is unsupported elsewhere and instead reminds one of the wearing of tapa cloth turbans by Fijian chiefs. In another unsupported reference, Riley (1994:121) describes an aute neck band used to bind around sweet-scented leaves, worn by chiefs and said to bring good luck in fishing and hunting. As a further extension of the association of aute cloth with chiefly rank, Riley (1994:121) mentions aute cloth being wrapped around a chief's "turupou or wooden staff of office".

With regard to the association of *Broussonetia* barkcloth with symbols of gods, Buck (1924:33) has asserted that "aute cloth was also used to wrap round the material representations of the gods in wood or stone". Buck then goes on to quote Gudgeon's (1885:171) description of the symbol for the god Ihungaru which was "formed of a lock of human hair twisted with rope of aute (paper mulberry bark)" as an example of the use of *Broussonetia* cloth in the actual material construction of a god. However, Ihungaru had been brought from Hawaiki. Probably related to this usage of aute cloth as a material symbol of a god is Goldie's 1905 account (Riley 1994:120) of a piece of aute cloth or perhaps unbeaten bark being ceremonially placed as a "waka atua", a vessel or material representation of a god, on the body of a seriously ill person. Similar religious sentiments are present in the reported use of *Broussonetia* barkcloth for swathing the dead (Simmons 1978:14), and in the use of aute cloth or perhaps the leaves, for wrapping the iho (umbilical cord of newborn babies) before hanging

it in a special hinau tree at Ohau in the Urewera which was believed to have powers of aiding conception (Goldie 1904:95). When a Te Uri-o-Hau chief named Te Toko-o-te-rangi from Kaipara visited a priestess at Kaikohe to obtain an atua to aid his tribe against Ngapuhi he was given the symbol of this god in the form of a nephrite hei-tiki carefully wrapped in aute bark (Smith 1910:33).

Two other very doubtful usages of *Broussonetia* barkcloth should be mentioned for the record. Riley (1987:66) has quoted John White's description of greenstone anklets bound on the inside with aute cloth to protect the ankle from being bruised. Even more questionable is an account quoted by Best (1925c:289) describing how the awning on the Takitimu migratory canoe was constructed of an arched framework of rods bent over the hull and covered with woven mats or sheets of aute barkcloth.

Finally, Riley (1994:122) has listed various Maori medical usages of *Broussonetia* products, both as external bandages or gauze sponges and as an internal medicine.

CONCLUSION

In general, the evidence for New Zealand barkcloth manufacture and use is strongest in North Auckland and the Waikato, with subsidiary concentrations in Hauraki, central Bay of Plenty and the East Coast. The unique and untypical beater from Taranaki may document the extension of this technological complex into the colder southerly regions of the country or it may be a remnant of some other technology based on different plants. In a contradictory manner, the placename of Te Aute in Hawkes Bay appears to be evidence that the paper mulberry tree did not grow there. Even more puzzling is the restriction of finds of actual barkcloth to a very limited area of Otago, almost as far as possible from the northern regions of documented manufacture. Various suggestions of external importation, of manufacture from local trees, or of differential survival in a dry climate, cannot be proven or disproven at this stage.

This study has now produced a strange contradiction. On the one hand, much new evidence has been assembled on the frequency and wide geographical range of barkcloth manufacture in New Zealand. But on the other hand, it has led to a questioning of some of the accepted traditional uses for aute barkcloth. There is no doubt that at some time in New Zealand's prehistory, barkcloth was probably used much more widely than the limited sole usage as ear rolls seen by the first European visitors. Nevertheless, we need to be much more cautious in assuming what these wider usages might have been.

As it is most unlikely that any barkcloth or objects incorporating barkcloth will be found archaeologically, especially in the North Island which lacks the dry cave deposits of Otago, the only source of further information about traditional usages lies in very careful textual reading and criticism of the available Maori literary sources. The very limited critical textual study pursued above shows that for our purposes here, these Maori sources have many problems of re-interpretation, unacknowledged additions, and lack of historical context to show what influences have been at work on the production of each text. This is a normal feature of any active oral tradition adapting to new historical situations. At the very least, this study should have alerted readers to the presence of speculative historical reconstructions in much of the accepted writings about the use of barkcloth in pre-historic New Zealand.

Another major problem that has emerged is the present lack of any established techniques for distinguishing scientifically between New Zealand barkcloths made from the fibres of paper mulberry, the ribbonwoods and lacebark trees. As Gardner discovered, this will require detailed chemical analysis, a project for the future.

The detailed description and comparative analysis of the New Zealand barkcloth beaters has provided some indication of regional differences within this technological complex. These descriptions and analyses also provide a body of information for future archaeological comparison and culture history investigations, both within New Zealand and back into ancestral Polynesia.

Finally, whatever the details of its manufacture and use, this study confirms that *Broussonetia papyrifera* barkcloth in pre-European New Zealand was certainly an important, even if not a very plentiful, component of traditional Maori material culture.

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